STUDY OF SAMM

IN A TERTIARY CARE HOSPITAL

A Dissertation Submitted to

THE TAMILNADU DR. M.G.R MEDICAL UNIVERSITY

CHENNAI

in Partial fulfilments of the Regulations

for the Award of the Degree of

M.S. (OBSTETRICS & GYNAECOLOGY) BRANCH – II

K.A.P.V. GOVT. MEDICAL COLLEGE

TRICHY

MAY 2019

CERTIFICATE BY THE DEAN

This is to certify that dissertation entitled **"STUDY OF SAMM IN A TERTIARY CARE HOSPITAL"** is a bonafide work done by **Dr. A.ADHIRAI at K.A.P.V GOVT MEDICAL COLLEGE.** This dissertation is submitted to Tamilnadu Dr.M.G.R. Medical University in partial fulfillment of university rules and regulations for the award of M.S. Degree in Obstetrics and Gynaecology.

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This is to certify that this dissertation entitled **"STUDY OF SAMM CASES IN A TERTIARY CARE HOSPITAL"** submitted by Dr.A.ADHIRAI, appearing for Part II MS, Branch II Obstetrics and Gynecology Degree Examination in April 2019, is a Bonafide record of work done by her, under my direct guidance and supervision as per the rules and regulations of the Tamil Nadu Dr. MGR Medical University, Chennai, Tamil Nadu, India. I forward this dissertation to the Tamil Nadu Dr. MGR Medical University Chennai, India.

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Medical College & Hospital

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DECLARATION

I, **Dr.A.ADHIRAI**. solemnly declare that the dissertation titled, **"STUDY OF SAMM IN A TERTIARY CARE HOSPITAL"** is a bonafide work done by me at KAPV Govt. Medical College, Trichy during October 2016 to September 2018 under the guidance and supervision of **Prof. Dr. UMA MOHANRAJ M.D., D.G.O., DNB.**, Professor, The department of Obstetrics and Gynaecology. The dissertation is submitted to the Tamilnadu Dr. M.G.R. Medical University, in partial fulfilment of University rules and regulations for the award of M.S. Degree in obstetrics and Gynaecology.

Date: **Dr. A.ADHIRAI**

Place: Trichy

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Finally I thank Lord Almighty, who gave me the will power and showered blessings to complete my dissertation work.

Dr. A.Adhirai

PLAGIARISM CERTIFICATE

This is to certify that this dissertation work titled **"STUDY OF SAMM CASES IN A TERTIARY CARE HOSPITAL"** of the candidate **Dr. A.ADHIRAI** with registration Number **221616501** for the award of **MASTER OF SURGERY** in the branch of **OBSTETRICS AND GYNAECOLOGY**. I personally verified the urkund.com website for the purpose of plagiarism Check. I found that the uploaded thesis file contains from introduction to conclusion pages and result shows **10** percentage of plagiarism in the dissertation.

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Instances where selected sources appear:

20

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CERTIFICATE OF CLEARANCE

This is to certify that the project work titled **Study of Samm (Near miss who criteria in obstretics)** proposed by **Dr.A.Adhirai,** part of fulfillment of M.D/M.S course in the subject of **Obstetrics and Gynaecology** for the year **2016-2019** by The Tamilnadu Dr.MGR Medical University has been cleared by the Ethics committee.

CHAIRMAN,
Institutional Ethics Committee
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CONTENTS

INTRODUCTION

Severe Acute Maternal Morbidity (SAMM) is the acronym for the more popular term of 'near miss' cases. "It is severe life threatening obstetric complication necessitating an urgent medical intervention in order to prevent the likely death of the mother"

Maternal mortality is the tip of the iceberg, there is a large base of the severe acute maternal morbidity, the identification & analysis of which will tell the true story of the complication.

Worldwide, daily approximately 800 women die every day from preventable causes related to pregnancy & delivery. Most of the situations are preventable. About 99% of maternal deaths occur in developing countries.

Analysis of near miss cases will help to assess the quality of service & will suggest the areas where improvements are to be brought in ; both in trained personnel & in equipment & can strengthen our understanding of the disease progression that ultimately saves the woman & there by empower us to prevent maternal death. The analysis of maternal death has long been used for the evaluation of quality of women's health care & the level of socio economic development.

Near Miss appraisal has emerged as the new Yard Stick to assess the quality of maternal health care. Maternal Near Miss defined as "A Women who nearly died but survived a complication that occurred during child birth or within 42 days of termination of pregnancy"[1]

For every maternal death, there are approximately 100 women with severe acute maternal morbidity are referred to as maternal near miss at our institution. Compared to maternal death audit, assessment of maternal near miss offers several advantages.

SAMM is an apt for the present health providing system[2]. SAMM has been studied extensively in the recent past as a complement for maternal mortality & also to evaluate the quality of obstetric care.[3]

In 2009, WHO published near miss criteria to provide standardized approach to identify near miss cases in both individual institution & larger health care system would thus allow for the development of interventions to improve maternity health care. While there has been increased uptake of WHO near miss criteria in developing nations, most developed nations have continued to utilise their own reporting systems.[4]

The aim of this study was the application of the WHO near miss criteria & to assess its utility in identifying cases of severe maternal morbidity in our tertiary hospital setting.

Potential Life Threatening Complications

Haemorrhagic Disorders	**Hypertenisve Disorders**
Abruption placenta	severe preeclampsia
Accrete /increta /percreta placenta	Eclampsia
Ectopic pregnancy	severe hypertension
PPH	Hypertensive encephalopathy
Ruptured uterus	HELLP syndrome
Other systemic disorders	**Severe managemental indicators**
Endometritis	Blood transfusion
Pulmonary edema	Central venous access
Respiratory failure	Hysterectomy
Seizures	ICU admission
Sepsis	Prolonged hospital stay(>7 days)
Shock	Non anesthetic accidents
Thrombocytopenia	Return to operating room
Thyroid crisis	Surgical intervention

WHO Maternal near MISS Criteria (SAMM)

Clinical criteria

Acute cyanosis

Gasping

Respiratory rate>40 or <6/min

Shock

Oliguria non responsive to fluids or diuretics

Clotting failure

Loss of consciousness lasting ≥ 12 hrs.

Loss of consciousness lasting AND absence of pulse/ heart beat

Stroke

Uncontrollable fit/total paralysis

Jaundice in the presence of preeclampsia

Laboratory-based criteria

Oxygen saturation <90% for ≥60 min

Pao2/fio2<200 mmhg

Creatinine≥300µmol/l or 6.0mg/dl

Ph<7.1

Lactate>5

Acute thrombocytopenia

loss of consciousness and the presence of glucose and ketoacids in urine

Management-based criteria
Use of continuous vasoactive drugs
Hysterectomy following infection or haemorrhage
Transfusion of ≥5 units red cell transfusion
Intubation and ventilation for ≥60 min not related to anaesthesia
Dialysis for acute renal failure
Cardio-pulmonary resuscitation.

AIM AND OBJECTIVES

The main aim and objectives are:

- To assess the incidence of near-miss instances
- To analyze the causes of near miss instances
- To identify associated factors responsible for near miss instances

REVIEW OF LITERATURE

Maternal Mortality Rate is an indicator of maternal health and obstetric care. Globally, the maternal mortality ratio dropped from 385 maternal deaths per 100000 live births in 1990 to 210 in 2013 to 150 in 2015 with 45% reduction. Most High Income Countries have low maternal death rates generally ranging from 3 to 12 per 1 lakh that have consistently decreased in the last 24 years. Low and Middle Income countries still bear 99% of the burden of the maternal mortality. A sustainable developmental goal for 2030 is to reduce the global MMR to 70 per 100000 live births and for no country to exceed two times the ratio.[5,6]

The MMR is 912 per 100000 live births according to WHO-2012. With the fall in MMR in advanced countries, SAMM has been proposed as an indicator quality of obstetric care

In 2016, MMR in India is 130 per 100000 live births,

MMR in Tamil Nadu 66 per 100000 live births.

The improvement of maternal health has made slow progress in most of the countries.[7] According to WHO (World Health Organization), The UNICEF (United Nation International Children's Education Funds), UNPF (United Nation Population Fund), World bank (2014) estimates globally 2,89,000 maternal death occurred in 2018.

Thus in this situation SAMM /Maternal Near Miss could serve as a surrogate for maternal death to evaluate the quality of obstetric care in particular health institution.

A maternal near miss evento or SAMM is currently complication that occurred during pregnancy, child birth or within 42 days of termination of pregnancy" [8,9,10]

Globally more than half of the maternal deaths were due to haemorrhage and hypertensive disorders and sepsis common causes of maternal mortality varied by regions[10]. Because there was no uniform criteria for identification of near miss cases and no standard definition of maternal near miss until 2009 and heterogeneous estimate of rates was observed in different published literatures around the world. [11,12,13]

The Ministry of health, taken actions so far include organizing and mobilizing the health developmental army at all levels to promote behavioural change, the distribution of 108 ambulances to all districts and promotions of free maternity mobile services at different health care levels, the training of human resources at primary health level and health professionals in health facilities, the provision of adequate drugs, medical supplies and equipments. [14]

There is a need to assess the magnitude and possible cause that contribute to the maternal mortality. However, maternal near miss is a rare event. There is a benefit in including a large number of cases for analysis, as research related to maternal near miss is crucial, when examining the quality of obstetric care.

In 2009, WHO established a set of criteria for SAMM and for near miss in order to standardize data and to calculate indicators for comparing different settings and identify cases of interest. Severe acute maternal morbidity (SAMM) and maternal near miss or events involved in biological continuum that goes from the normal healthy situation of pregnancy to maternal deaths.[15,16]

The identification of cases of maternal near miss is an alternative to the investigation of maternal deaths, when assessing the quality of obstetric care.

Conceptually, maternal near miss represent part of continuum between extremes of good health & death. On this continuum, pregnancy, labour or the puerperium may be perceived as uncomplicated, complicated, severely complicated or life threatening or fatal.

Indeed from obstetric condition, the woman may recover, become temporarily or permanently disabled or die. The drawback in designating, where woman is positioned as a maternal near miss on this continuum

lesion is the definition of the threshold of severity above which morbidity qualifies to be near miss.

While this threshold is clear for some obstetric condition or their management (for instance, ruptures managed by emergency hysterectomy) or severe post partum haemorrhage requiring massive blood transfusion. It may be uncertain or ambiguous for other condition such as Sepsis.

Secondly, the threshold above which an adverse obstetric event becomes life threatening may be context specific. This is so because the probability of death from such complications depends not only on the women's vulnerability to succumb to a given complication but also on access to prompt and quality care.

The definitions used to identify a maternal near miss have to take the local context into consideration and therefore health system factors.

Three approaches have been proposed for definition of maternal near miss.

1. Utilization of clinical features (sign, symptoms, clinical features such as eclampsia, uterine rupture)
2. Criteria of organ dysfunction
3. Criteria utilizing clinical management practices (such as admission to intensive care).

Morbidity data is vital for health planners and policy makers who need to know how many women need essential obstetric care. Morbidity

data and case fatality ratios are essential and reliable indication of the quality of obstetric care and the efficiency of the health system and therefore can supplement maternal mortality data.

Maternal Mortality Ratios are difficult to use for evaluating the success of programme (designing, monitoring & evaluating maternal mortality programmes)

We assess the prevalence/ incidence of maternal near miss morbidity, maternal mortality and case fatality ratio through systemic review of literature.

The search was conducted by me based on the medical and social science and data bases including pubmed medline, popline, social science scitation index from 2016 to 2018 were searched for studies on life threatening obstetric complication, severe acute maternal morbidity.

The key words used were severe acute maternal morbidity or near miss maternal morbidity limited to KAPV Govt. Medical College. I also critically reviewed the reference list of these identified articles in an attempt to identify more articles.

We analysed studies which reported information (in pregnancy, child birth or puerperium) on severe maternal morbidity.

Maternal near miss a concept of paradigsm began in the early 1990's in reference to women who survived severe acute obstetric complication our review attempts to highlight studies that utilizes this concept or paradigsm

(irrespective of the terminology used to refer to these cases of SAMM who would have died of pregnancy complications but somehow survived).

Since it is very difficult to assess the quality of secondary data, all secondary datas was excluded from this analysis. I included all cross sectional, descriptive and prospective studies on severe maternal morbidity conducted in KAPV, Trichy.

Mantel conducted a study in 1998 in which all cases fitting the definition of maternal near miss were identified the reasons for being classified as a near miss were recorded and the primary obstetric factors and any organ failure or dysfunction were identified. The chief reason of such a classification was to assist in prevention programmes.[17]

A retrospective study was conducted at the obstetric unit of olabisi onabanjo university teaching hospital sagamu betweek 2002 and 2004, to determine the frequency of near miss (SAMM) and the nature of near miss events and comparatively analysed near miss morbidities and the maternal death among pregnant women managed over a 3 year periods.. They concluded that the quality care received by this patient was sub optimal. They also proposed the development of evidence based protocol and the improvement of resource for managing severe morbidities in cases of hypertension and heamorrhage.

A study conducted in public and private hospitals in Indonesia between 2003 and 2004 showed a higher prevalence of near miss in the public hospitals when compared to private hospitals. About 70% were in a critical state on admission at the public hospital suggesting the delay in reaching the hospital.

A nationwide population based study on SAMM during a 2 year period in the Netherlands, found the immigrant women to be at a higher risk and substandard care was found in the majority of cases assessed through clinical audit.

It is crucial to arrive at the uniform criteria by which a near miss/SAMM case is identified in order o advance wider use of third concept as a tool to investigate and improve the quality of obstetric care and to calculate comparable summary estimates across settings and over time.

WHO has initiated a process in agreeing on a definition and developing a uniform a set of identification criteria (clinical criteria, laboratory based criteria, management based criteria) for maternal near miss cases aiming to facilitate the reviews of these cases for monitoring and improving quality obstetric care.[18]

An effective program of medical audit will help provide reassurance to doctors, patients, and the managers that the best quality of service is being achieved, having regard for the resources available. Many types of audit of clinical practices have been developed.

One such audit of the quality of maternal care is confidential enquiry into maternal deaths.

The presumption of most of the audit programmes is that by looking at a specified case, solutions to inadequacies found will improve not only the quality of care of similar cases but also the care of other patients in the services.

METHODS AND MATERIALS

Quality of Methods & Data Abstraction

For the assessment of the study quality, a structured data collection form from the WHO systematic review of maternal mortality & morbidity was used. The study quality was assessed by using the following criteria.

1. Description of study period .
2. Information about population characteristics.
3. Information about setting & context.
4. Information about eligible & lost subjects.

Definition of condition used (for maternal morbidity), forms of reporting data, information about using special efforts to capture all cases of severe morbidity or maternal deaths, limitations of the studies & criteria used to address credibility & internal validity. Data on the incidence or prevalence of maternal near miss & case fatality was extracted.

The prevalence or incidence ratio of maternal near miss was estimated on the total number of such events divided by total number of participants in the particular study.

Study Settings & Periods

Because most critical maternal cases are referred to our hospital known to provide better care, the presence of ICU, maternity ward, blood transfusion series & facility for superspeciality.

Study Designs & Methods

`A facility based descriptive study design was used to address the objectives of the current study. A descriptive study with nested component was conducted to identify pregnant women who were @ risk of SAMM in KAPV Govt maternity hospital from October 2016- September 2018.

Case identification was prospective & data collection was performed concomitantly. The population studied is of low socioeconomic level & the vast majority depends on the public health system. This institution is responsible for 800- 1000 deliveries per month, is the reference maternity hospital for low, medium & high risk cases.

In this study, we included all admitted patients that fulfilled the current criteria for SAMM according to WHO working group on maternity mortality & morbidity.

Identification of Cases

All women admitted to the participating hospital during the study period for the treatment of pregnancy related complication (such as ectopic pregnancy, abortion) having delivered or within 42 days of termination of

pregnancy & who fulfilled at least one of the condition stated in WHO criteria [8].

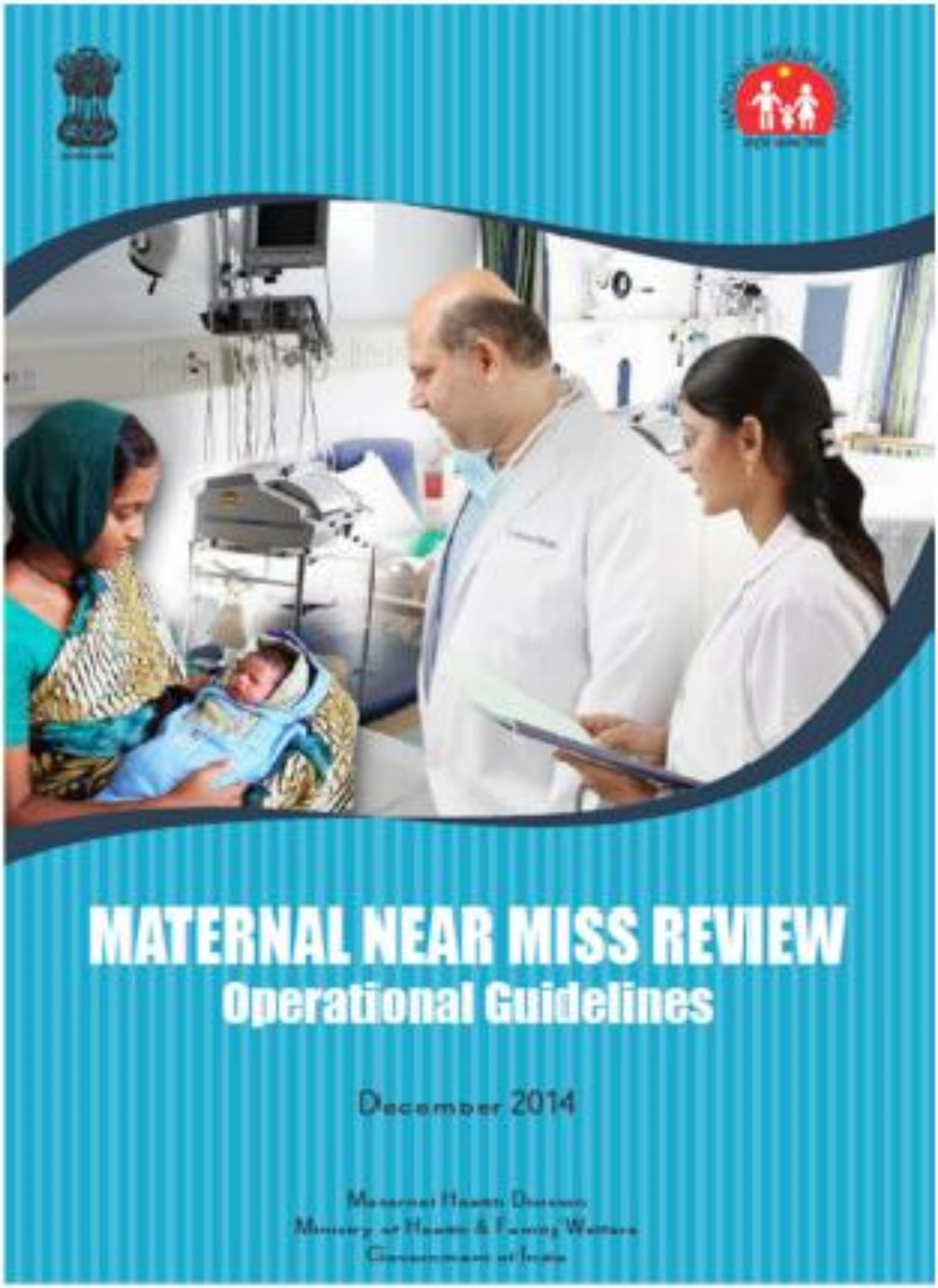
Maternal Near miss Operational Guidelines

The clinical findings, investigations, interventions have been put under three broad categories,

1. Pregnancy specific obstetric and medical disorders.
2. Pre-existing disorders aggravated during pregnancy.
3. Accidental / incidental disorders in pregnancy.

These broader categories have further been segregated under different clinical situations like haemorrhage, sepsis, hypertension.

Depending on when the near miss occurred, maternal near miss cases were further categorized into two groups. Women who were assessed as being in critical condition on arrival to a hospital were classified as near miss before arrival, However if the near miss occurred during hospitalization, it was classified as near miss after arrival.


MATERNAL NEAR MISS REVIEW
Operational Guidelines
December 2014

MATERNAL NEAR MISS OPERATIONAL GUIDELINES, NRHM 2014.

- **For diagnosis of Near Miss, the patient should meet Minimum 3 criteria: one each from 1) clinical findings(either symptoms or signs), 2) investigations & 3) interventions done Or Any single criteria which signifies cardio respiratory collapse as indicated with heart (♥)symbol**

PREGNANCY SPECIFIC OBSTETRIC AND MEDICAL DISORDERS

Adverse Event	Disorders/Conditions or Complications	Clinical findings		Results of Investigations	Interventions
		Symptoms	Signs		
HAEMORRHAGE	• Abortion → Spontaneous / Termination of Pregnancy (Safe/Unsafe) • Ectopic Pregnancy • Gestational Trophoblastic Disease • Antepartum hemorrhage -Placenta previa -Placental abruption • Scar dehiscence • Rupture uterus • Surgical injury during labour, Caesarean Section/ Forceps or Vacuum delivery • Third Stage complications, e.g. Inversion of uterus, retained placenta, Cervical tear, others • Post partum haemorrhage -Atonic -Traumatic • Amniotic Fluid Embolism	Any Bleeding from or into the genital tract leading to • Air Hunger • Syncopal attacks	• Altered conscious state • Tachycardia >120/min Low volume pulse • Bradycardia <40/min • Tachypnea >40/min • Bradypnoea < 6 /min • Blood pressure - Systolic < 90 mmHg - Diastolic < 60 mmHg • Absent peripheral reflexes • Oliguria with output < 30ml/hour	• Acute fall Hb < 5 gm % or 30 % fall in haematocrit (fall in hemoglobin so as to affect oxygen saturation) • ♥ Fall in oxygen saturation below 90 % • ♥ $PaO_2 : FiO_2 < 200$ • ♥ $PaCO_2 > 50$mm Hg • ♥ Platelet < 20,000 (Acute Decline in platelet count more significant) • ♥ Clot observation time > 7 min. or any other test done which proves deranged coagulation profile • Serum creatinine >3.5mg/dL • ECG – Ischemic changes, ST inversion, elevation	• ♥ ICU admission requiring resuscitative (CAB) or cardio respiratory support • ♥ Blood & blood products transfusion (more than 90 ml/kg body weight/ >5 units of blood) • ♥ Use of cardiotonics/ vaso pressors (Mephentine/Dobutamine/ Dopamine etc) • ♥ Circulatory collapse requiring Emergency Surgery for controlling blood loss such as urgent Evacuation, Laparotomy with or without Hysterectomy, Internal Iliac Ligation or any Suturing of tears with a background of hemorrhage • Dialysis- peritoneal/ hemodialysis (renal replacement therapy)

PaO2 : Partial pressure of oxygen in the blood, FiO2 : Fraction of inspired oxygen, PaCO2 : Partial pressure of carbon dioxide in the blood.

SESIS	• Septic Abortions → Termination of pregnancy / Spontaneous • Prelabour rupture of membranes Term/Preterm • Puerperal sepsis • Post surgical procedures (E.g. Cesarean section, laparotomy, evacuation, manual removal of placenta , others)	• High grade fever • Abdominal pain • Distention of abdomen • Vaginal foul smelling discharge • Decreased urinary output • Altered consciousness • Difficulty in breathing	• Delirium/altered conscious state • Persistent rise in Temp >39.2°C, not responding to routine treatment • Hypothermia temp < 37 ° C • Pulse rate > 120/min • Thready, low volume pulse • Tachypnoea> 20/min • Rebound tenderness of abdomen, guarding, rigidity • Clinical evidence of septic focus in body, Pus discharge from wound, cervix or vagina	• Leucocytosis (>15,000/cu mm) • Microbial culture positive for organisms • Ultrasound shows intra uterine/ pelvic/ abdominal collection • Imaging modality showing bladder/bowel /uterine injuries e.g.. air under diaphragm	• ♥ ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • Shifting to intravenous fourth general Antibiotics like(Sulbactum+ Cefoperazone combinations, Imepenum etc) • ♥ Blood component transfusion (upto 90 ml /kg body weight/ >5 units of blood) • ♥ Use of cardiotonics/ vaso pressors (Mephentine/Dobutamine/ Dopamine etc) • ♥ Surgical procedure done (Evacuation, Laparotomy for Drainage of pus,Repair of Bladder, Bowel and /or Hysterectomy) • Dialysis – peritoneal /hemodialysis (renal replacement therapy)
HYPERTENSION	• Hypertensive disorders of pregnancy (Pregnancy induced hypertension, Preeclampsia, Eclampsia, HELLP Syndrome)	• Convulsions • Diminution/Blurring of vision • Severe epigastric pain • Severe headache non responsive to pain killers • Difficulty in breathing • Palpitations	• Altered conscious state • BP ≥160/110mm Hg • Deep Jaundice • Oliguria / anuria / haematuria • ♥ coma • Coagulation failure • ♥ Pulmonary edema • ♥ Evidence of circulatory collapse	• Proteinuria > 1 gm/dl • S. Creatinine >3.5 mg /dL • Elevated S Bilirubin (> 6 mg/dL) • ALT, AST(>100 IU/L) • Thrombocytopenia <20,000 • Haemolysis on peripheral smear • ♥ Clot observation time > 7 min. or any other test done which shows deranged coagulation profile • Hypertensive retinopathy > GRADE II • Abnormal ECG (ST inversion, elevation/ arrhythmias) • ♥ Cerebral hemorrhage on CT scan	• ♥ ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • ♥ Non responder to Magnesium sulphate • ♥ Mechanical Ventilation • ♥ Blood & blood products transfusion (more than 90 ml/kg body weight/ >5 units of blood) • ♥ Use of cardiotonics/ vaso pressors (Mephentine/Dobutamine/ Dopamine etc) • ♥ Status eclampticus

POSTPARTUM COLLAPSE	• Amniotic Fluid Embolism • Uterine Inversion	• Acute collapse of patient after delivery	• Pusle not recordable • BP not recordable • Cardiorespiratory arrest	• Acute fall Hb < 5 gm % (fall in hemoglobin so as to affect oxygen saturation) • ♥ Fall in oxygen saturation below 90 % • ♥ $PaO_2 : FiO_2$<200 • ♥ $PaCO_2$>50mm Hg • ♥ Platelet < 20,000 (Acute Decline in platelet count more significant) • ♥ Clot observation time > 7 min. or any other test done which proves deranged coagulation profile • ECG – Ischemic changes, ST inversion, • elevationw	• ♥ ICU admission requiring resuscitative (CAB) or cardio respiratory support • ♥ Blood & blood products transfusion (more than 90 ml/kg body weight/ >5 units of blood) • ♥ Use of cardiotonics/ vaso pressors (Mephentine/Dobutamine/ Dopamine etc) • ♥ Circulatory collapse requiring Emergency Surgery for controlling blood loss such as urgent Evacuation, Laparotomy with or without Hysterectomy , Internal Iliac Ligation or any Suturing of tears with a background of hemorrhage • Dialysis- peritonel/ hemodialysis
LIVER DYSFUNCTION / FAILURE	• Acute fatty liver of pregnancy • Acute Fulminant hepatic failure	• Convulsions • Altered behavior • Bleeding from various sites (nose, gums, IV access ports, varices)	• Unconsciousness • Deep jaundice • Hepatic flaps, tremors • Abnormal bleeding sites - haematuria, haemetemesis, haemoptesis, bleeding gums etc.	• Elevated Serum Bilirubin (> 6mg/dL) • Abnormal liver enzymes ALT,AST (> 100 IU/ L) • Abnormal ECG • Coagulation profile deranged • USG showing showing changes of Acute fatty liver ♥ Fibroscan showing changes of acute fatty liver	• ♥ ICU admission for resuscitation and cardiorespiratory support • ♥ Resuscitation • ♥ Mechanical ventilation • ♥ Blood and component transfusion (more than 90 ml/kg body weight/ >5 units of blood)

1.2 PREEXISTING DISORDERS AGGRAVATED DURING PREGNANCY

Anaemia	• Iron /Folic Acid Deficiency • Sickle cell Disease • Thallasemia • Aplastic Anaemia	• Dyspnea • Palpitations • Syncopal Attack • ♥ Altered conscious state • Features of Sickle cell crisis such as bone pains, joint pains, acute abdominal pain etc • Swelling over body	• Severe Pallor • Jaundice • Tachycardia- pulse rate >120/ min • Tachypnea>20/min • Tender, inflamed joints • Sternal tenderness • Spleenomegaly • Anasarca • Ascites • ♥ Signs of congestive cardiac failure • Bleeding Tendencies	• Hemoglobin below 5 gm/dl • Hemoglobin status not able to maintain O_2 saturation of 90% • Platelet < 20,000 • ♥ Clot observation time > 7 min. or any other test done which proves deranged coagulation profile • Elevated S Bilirubin (> 6 mg /dL)	• ♥ ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • ♥ Blood /component transfusion (Upto 90 ml /kg/ >5 units of blood) • ♥ Use of cardiotonics/ vaso pressors (Mephentine/Dobutamine/ Dopamine etc)
Respiratory Dysfunctions	• Asthma • Tuberculosis • Pneumonia	• Breathlessness /Air hunger • High/Low grade fever • Chronic weight loss	• Tachycardia- pulse rate >120/ min • Tachypnea - >20/min • Orthopnea • Abnormal Chest signs (Ronchi, Crepts, Absent breath sounds) • Signs of Cardiorespiratory failure • Cynosis, flaps	• Various lesions on chest X ray (with shielding of abdomen) specific to disease • ♥ Abnormal Acid Base values PH <7.35 or >7.45 PCO_2 >50 or <30 mmHg PO_2 arterial < 80 mmHg PO_2 venous <40 mmHg	• ♥ ICU admission for resuscitation and Cardiorespiratory Support, and or Endotracheal Intubation

Cardiac Dysfunctions	• Rheumatic Heart Disease • Congenital Heart Disease • Cardiomyopathies • Aortic Aneurysm • Collagen Disorders	• Breathlessness/Air hunger • Orthopnea • Palpitations • Paroxysmal nocturnal dyspnea • Chest pain	• Tachycardia - pulse rate >120/ min • Bradycardia > 40/min • Irregular pulse • Tachypnea > 40/min • Bradypnoea < 6/min • Organic murmurs • Cardiomegaly • Tender hepatomegaly • Signs of CCF/LVF Pitting edema, raised JVP, basal crepts etc.	• Abnormal ECG • Abnormal Echocardiography • ♥ Abnormal Acid Base values PH <7.35 or >7.45 mmHg PCO_2 >50 or <30 mmHg PO_2 arterial < 80 mmHg PO_2 venous <40 mmHg	• ♥ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • ♥Ventilatory support, • ♥Digitalisation • ♥Use of cardiotonics
Hepatic Dysfunction	• Cirrhosis of liver • Portal hypertension • Acute liver failure	• Yellowness of urine / eyes/other body parts • Convulsions • Altered behavior • Bleeding from various sites (nose,gums, IV access ports, varices)	• Deep Jaundice • ♥Hepatic flaps/ tremors • Abnormal bleeding sites - haematuria, haematemesis, haemoptysis, bleeding gums etc. • Abnormal bleeding from nose, gums, I/V sites, varices • HepatomegalyAscites	• Elevated Serum Bilirubin (>6 mg /dL) • Abnormal liver enzymes ALT,AST (> 100 IU / L) • Abnormal ECG • ♥Clot observation time > 7 min. or any other test done which proves deranged coagulation profile • Imaging modalities showing hepatomegaly ,splenomegaly and any other abnormalities	• ♥ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • ♥Mechanical Ventilation • ♥Blood and component transfusion
ENDOCRINAL DISORDERS **Diabetic Ketoacidosis**	• Gestational diabetes mellitus • Diabetes mellitus	• Altered conscious state • Breathlessness / Air Hunger • Palpitations • Convulsions • Bladder/Bowel dysfunction	• ♥Features of circulatory collapse • Neurological deficit like muscular weakness, paresis, plegia • ♥Altered consciousness • ♥Coma	• Ketoacidosis pH < 7.35 RBS > 200 g/dL • Abnormal ECG • Electrolyte imbalance (Sr Na < 129 K <3.2 - >5.5	• ♥ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • ♥Mechanical Ventilation • Resuscitative Procedures • Management of Ketocidosis (Insulin or glucagon)
Thyroid Crisis	• Thyrotoxicosis • Thyroid storm • Pheochromocytoma	• Palpitations • Convulsions • Bladder/Bowel dysfunction	• Altered consciousness • Coma • Tachycardia pulse > 120 bpm	• Sr T_4 elevated (>200 IU) • Low TSH (< 0.2 IU) • Ischaemic changes on ECG • Elevated Vinyl mandilic acid	• ♥ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • ♥Mechanical Ventilation • Resuscitative Procedures

Neurological Dysfunction	• Epilepsy • Cortical vein thrombosis	• Syncopal attacks • Convulsions • Unconscious state	• Altered conscious state and coma • Abnormal reflexes (hyper or absent) • Paresis/plegia • ♥Cardiorespiratoy failure	• Abnormal EEG • Abnormal acid –base status • ♥CT/MRI head showing abnormalities	• ♥ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • Shifting to intravenous Antibiotics fourth generation • ♥Mechanical ventilation • Heparanisation
Renal Dysfunction / Failure	• Medico renal disease e.g chronic/acute renal failure • Renal artery stenosis • Transplant complications • Collagen Disorders	• Reduced / absent urine • Edema all over body • Breathlessness (due to volume overload) • Unconscious state	• Oliguria - < 400 ml urine output in 24 hours not responding to fluid therapy and diuretics • Anuria • ♥Coma	• USG showing renal abnormalities • Doppler USG showing stenotic renal artery • Deranged KFT	• ♥ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • Need for dialysis peritonel/ hemodialysis

1.3 INCIDENTAL AND ACCIDENTAL CAUSES IN PREGNANCY

Accident/assault/ surgical problems	• Trip or fall • Vehicular accident • Violence • Blunt trauma abdomen • Assault • Burns • Poisoning • Cancers • Acute surgical condition • Suicide attempt • Snake bite • other	• History of trauma or accident, suicide attempt • Syncope • Pain (abdominal or pertaining to specific site) • Blurred vision • Bleeding • ♥ Convulsions • ♥ Altered behavior	• Altered conscious state • Tachycardia > 120/min, low volume pulse • Bradycardia <60/min • Tachypnea >20/min • Blood pressure Systolic < 90 mmHg Diastolic < 60 mmHg • Tenderness, rigidity and guarding of anterior abdominal wall with/ without distension • ♥ Cardiorespiratory failure • Evidence of trauma /burns	• Acute fall Hb < 5 gm (fall in hemoglobin so as to affect oxygen saturation) • Fall in oxygen saturation below 90 % • ♥ PaO_2 : FiO_2 <200 • ♥ $PaCO_2$ >50mm Hg • Platelet < 20,000 acute decline in platelet count more significant • ♥ Clot observation time > 7 min. or any other test done which proves deranged coagulation profile • USG showing trauma to vital organs • Imaging modality showing Injury to bladder, bowel, liver, spleen • CT/MRI showing injury	• ♥ ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • ♥ Blood &blood products transfusion (more 90 ml/kg body weight/ >5 units of blood) • ♥ Use of cardiotonics/ vaso pressors (Mephentine/Dobutamine/ Dopamine etc) • ♥ Surgical procedures done (laparotomy for intraperitoneal haemorrhage, repair of bladder, bowel, spleen, liver, kidney, burr hole for head injury)
Anaphylaxis	• Anaesthetic drugs • Antibiotics • Antimalarials • Iron preparations • Anticonvulsants • Blood transfusions • Other reactions	• History of taking the drug • Breathlessness • Air Hunger • Syncope • Not passing urine	• ♥ Altered conscious state • Tachycardia > 120/min thready, low volume pulse • Bradycardia <60/min • Tachypnea >20/min • Blood pressure - Systolic < 90 mmHg - Diastolic < 60 mmHg • Oliguria/Anuria	• Fall in oxygen saturation below 90 % on room air • ♥ PaO_2 : FiO2<200 ♥ $PaCO_2$>50mm Hg • Proteinuria > 1 gm/dl • S. Creatinine >3.5 mg /dL • Elevated S Bilirubin (6 mg/dL) ALT, AST(>100 IU/L) • Thrombocytopenia <20,000 • Haemolysis on peripheral smear • Clot observation time > 7 min. or any other test done which proves deranged coagulation profile • ECG	• ♥ ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • ♥ Blood & blood products transfusion (more 90 ml/kg body weight/ >5 units of blood) • ♥ Use of cardiotonics/ vaso pressors (Mephentine/ Dobutamine/ Dopamine etc • ♥ Use of Adrenaline Renal dialysis- peritoneal/ hemodialysis (Renal Replacement Therapy)
Infections	• Malaria • Dengue • H1N1 viral Disease • Lower respiratory tract infections • ARDS • Meningitis • Enchephalitis • Infective hepatitis (A,B,C,E) • HIV/AIDS • Scrub typhus • Nephritis • Other	• High grade fever (with/ without chills and rigor) • Yellowness of urine • Altered behavior • Breathlessness • Abdominal pain • Abdominal Distension • Unconscious state • Convulsions	• Altered conscious state • Persistent rise in Temp >39.2 °C, not responding to routine treatment • Hypothermia temp , 37 °C • Pulse rate > 120/min • Tachypnea> 20/min • Chest signs (Crepts, crackles, ronchi, decreased or absent air entry) • Neck rigidity • Coma • Bleeding from various sites	• Leucocytosis (>15,000/cumm) • Toxic granules on peripheral smear • Low platelets(<50,000) • Microbial culture positive for organisms • Dengue , paracheck, malarial parasite positive on ELISA/ peripheral smear • H1N1 ELISA positive • Spinal fluid positive for infection • Elevated serum bilirubin (>6 mg) • Abnormal liver enzymes (> 100 IU) • Abnormal ECG • Abnormal EEG • Clot observation time > 7 min. or any other test done which proves deranged coagulation profile • Positive Hepatitis markers • HIV ELISA positive	• ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • Shifting to intravenous Antibiotics of fourth generation (Sulbactum+ Cefoperazone combinations, Imepenum) • ♥ Blood component transfusion (upto 90 ml / kg body weight/ >5 units of blood) • ♥ Use of cardiotonics/ vaso pressors (Mephentine/Dobutamine/ Dopamine etc) • Injectable antimalarials • Use of drugs to relieve cerebral odema (Mannitol) • Antiretroviral therapy

Embolism and Infarction	• Pulmonary embolism • Cerebral embolism (stroke) • Cardiac embolism (myocardial infarction)	• Breathlessness • Air hunger • Collapse • Acute chest pain • Syncope	• Tachypnea - >20/min • BP : 1) Systolics <90 mhg. 2) Disystolics <60 mhg. • Weak pulse • Abnormal chest signs (Ronchi, Crepts, effusion) • Cardiorespiratoy failure • Sweating, cold and clammy skin	• Various lesions on chest X ray pertaining to disease • Abnormal ECG • CT/MRI showing Lesion	• ICU admission for resuscitative procedure like (CAB) or cardiorespiratory support • Blood component transfusion (upto 90 ml /kg body weight/ >5 units of blood) • Use of cardiotonics / vaso pressors (Mephentine/Dobutamine/ Dopamine etc • Anticoagulant therapy • Drugs to reduce cerebral odema (Mannitol)

Need for the Study

Each year in India, roughly 30 million women experience pregnancy & 27 million have live births. For every maternal death, there are close to 100 women with severe maternal morbidity. Compared to maternal death audit, assessment of maternal near miss offers several advantages.

SAMM cases continue to have huge impact on the lives of Indian women. Maternal death to near miss ratio & case fatality ratio are the main indicators of SAMM. There is a need to identify nearmiss cases to assess the quality of health care.

In Millenium development goal 2000, the goal number 5 was to improve the maternal health. It is falling way below our target, as our aim to reduce the maternal mortality by 75% by 2015 has not been met.[5]

Survivors can be interviewed, such that such review yield useful information on the pathways, that leads to severe morbidity & death. Hence, such assessment highlights the quality of obstetrics that are received.

The advantages of "near miss" over death are that near miss are more common than maternal deaths, their review is likely to yield useful information on the pathway that lead to severe morbidity and death, investigating the care received may be less threatening to providers because the women survived and one can learn from the women themselves since they can be interviewed about the case they received.

Sample Size Determination

The study is designed as a descriptive study. This study would be conducted on the women who experienced a maternal near miss event during pregnancy, delivery or the postpartum period where identified prospectively admitted at Mahatma Gandhi Memorial Hospital, Tiruchirappalli.

Data relating to the most important variables were abstracted from the medical record of the participants using the WHO data abstraction tool, with some modification. The datas were collected from the delivery ward, O& G ward, ICU ward.

For each maternal near miss case, the only one underlying cause was identified as per the WHO international statistical classification of disease & related health problem (ICD).

According to ICD, the underlying cause is the disease or injury which initiated the sequence of events leading directly to death.[19] Because the same classification is used for both maternal death & maternal near miss, the classification used for both maternal near miss were the same as those listed in ICD for maternal mortality. [20, 21]

However all possible contributing causes were connected, information regarding whether the near miss was present before arrival or developed during hospitalization was also collected in order to determine the place, where the near miss occurred. Data on the total number of live births

occurring over one year for our hospital, were extracted from Hospital Management Information System (HMIS)of our hospital.

Inclusion Criteria

A women presenting with any life threatening conditions and surviving a complication that occurred during pregnancy, child birth, or within 42 days of delivery & termination of pregnancy are included in this study.

1. SAMM identified as per WHO criteria - Those with organ dysfunction / organ failure. (Clinical criteria, laboratory based criteria, management based criteria).

Exclusion Criteria

1. Those who do not give consent.
2. SAMM due to non obstetric causes such as due to poisoning & trauma.
3. Those > 42 days of delivery or termination of pregnancy.

Study Design: Descriptive Study

Study Place: K.A.P.V Govt Medical College & MGMGH, Trichy at Department of Obstetrics & Gynaecology.

Period of study: October 2016 - September 2018.

Data Processing and Management

After getting consent the data that were collected using hard copies. Following this the data were entered into SPSS software version and were opened for final analysis.

Maternal Near Miss Indicators

1. Maternal near miss
2. Maternal death
3. Live birth
4. Severe maternal outcome ratio
5. Women with life threatening condition
6. Maternal near miss ratio
7. Maternal near miss mortality ratio
8. Mortality index : No of maternal deaths divided by the number of women with life threatening conditions, expressed as a percentage. the higher the index, is more women with the life threatening condition die (Low quality of care), while low index suggest better quality of Health Care.(MI= MD/ MNM+MD) *100.

Data Analysis

The total incidence of maternal near miss in the hospitals involved in this study was calculated using maternal near miss incidence ratio (MNMIR) formula. This was calculated by dividing the number of maternal near miss

cases during the study period (2 years) by the total number of live births during the same year,

$$\textbf{MNMIR} = \frac{\text{the number of maternal near miss cases during the study period (2 years)}}{\text{the total number of live births during the same year}}$$

In addition hospital access indicators, such as the number of women with a maternal near miss condition before arrival at the hospital were calculated. Intra hospital care indicators such as number of women with near miss who developed condition in the hospital, were also calculated.

In order to determine the underlying and contributory causes of maternal near miss, a descriptive frequency for each cause were calculated separately. The causes were categorized into underlying and contributory as per the WHO recommendation. Descriptive frequencies of the type of organ dysfunction present in maternal near miss cases were also calculated.

Data Quality Assurance

Data collections made by daily visit to labour ward, O&G AN ward, ICU ward, emergency gynaec op to check for the potential cases. The standardized data abstraction form developed by WHO was used to abstract patient information. Hence, all the above procedures, information's contribute greatly to obtaining quality data.

Ethics Statement

Acceptable ethical statement, were strictly adherent to throughout the study process. The study was first approved by the institutional ethical review committee on 2016 October. Adequate explanation about the purpose of the study and a letter of support was given to all concern bodies.

For studies that were not clinical trials that involved invasive procedures, taking verbal consent is the standard requirement of the institutional review board. Hence verbal consent was taken to abstract pertinent information from the participants' record.

DATA ANALYSIS

Table: 1

Educational qualification of SAMM

Particulars	No.of cases	Percentage
Illiterate	3	2.8
Literate upto 6^{th} std	6	5.71
Literate from 6^{th}-12^{th} std	85	80.9
Beyond 12^{th} std	11	10.47

In our study, the literate from 6^{th}-12^{th} was high of 85 cases (80.9 %), followed by beyond 12^{th} around 11 cases (10.47%). This table implies among 85 cases were literate from 6^{th} to 12^{th} std and they all have poor maternal health education & unaware of symptoms occurring in high risk during pregnancy. Some have reluctancy towards high risk symptoms.

Diagram: 1

Pie chart - Literacy Rate of SAMM Cases

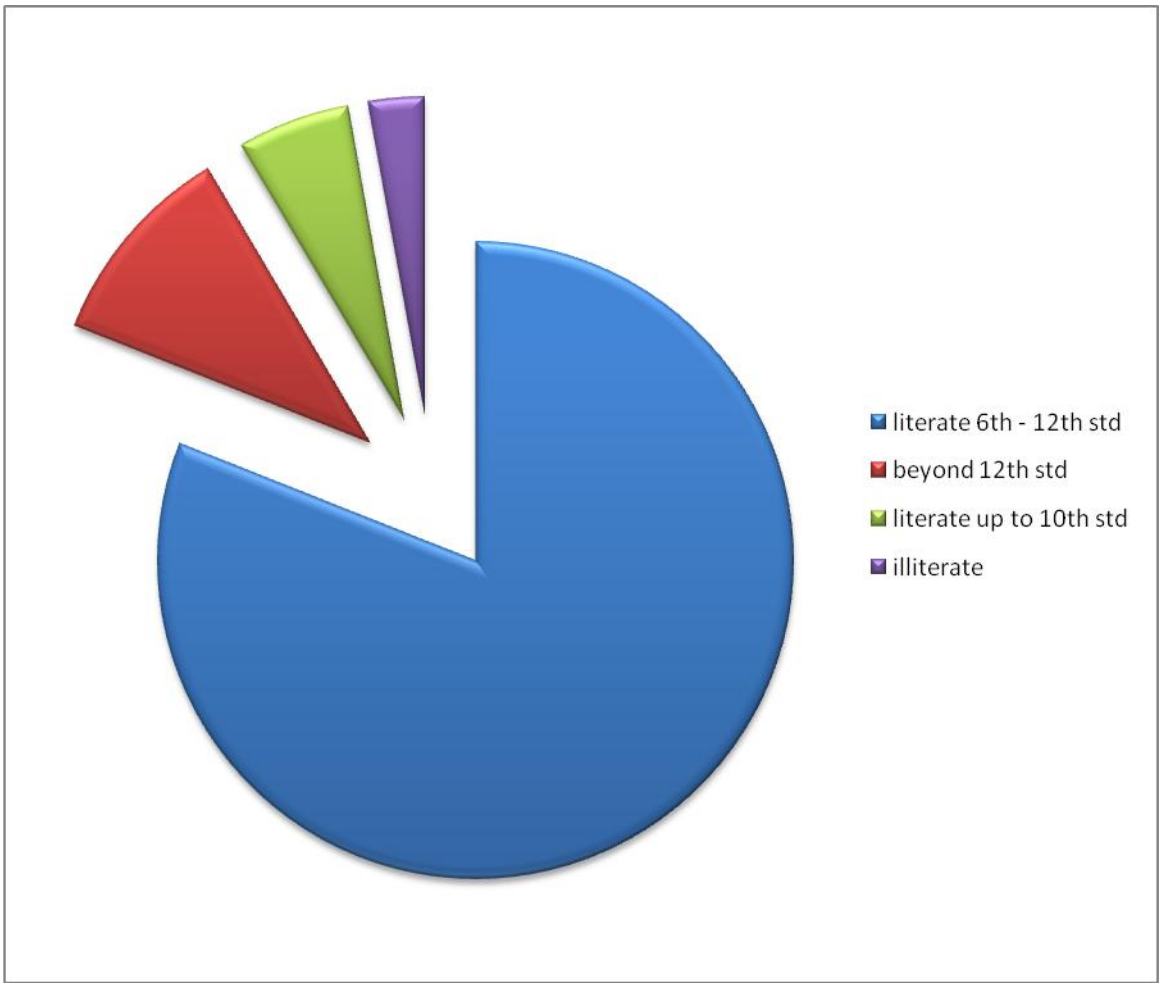


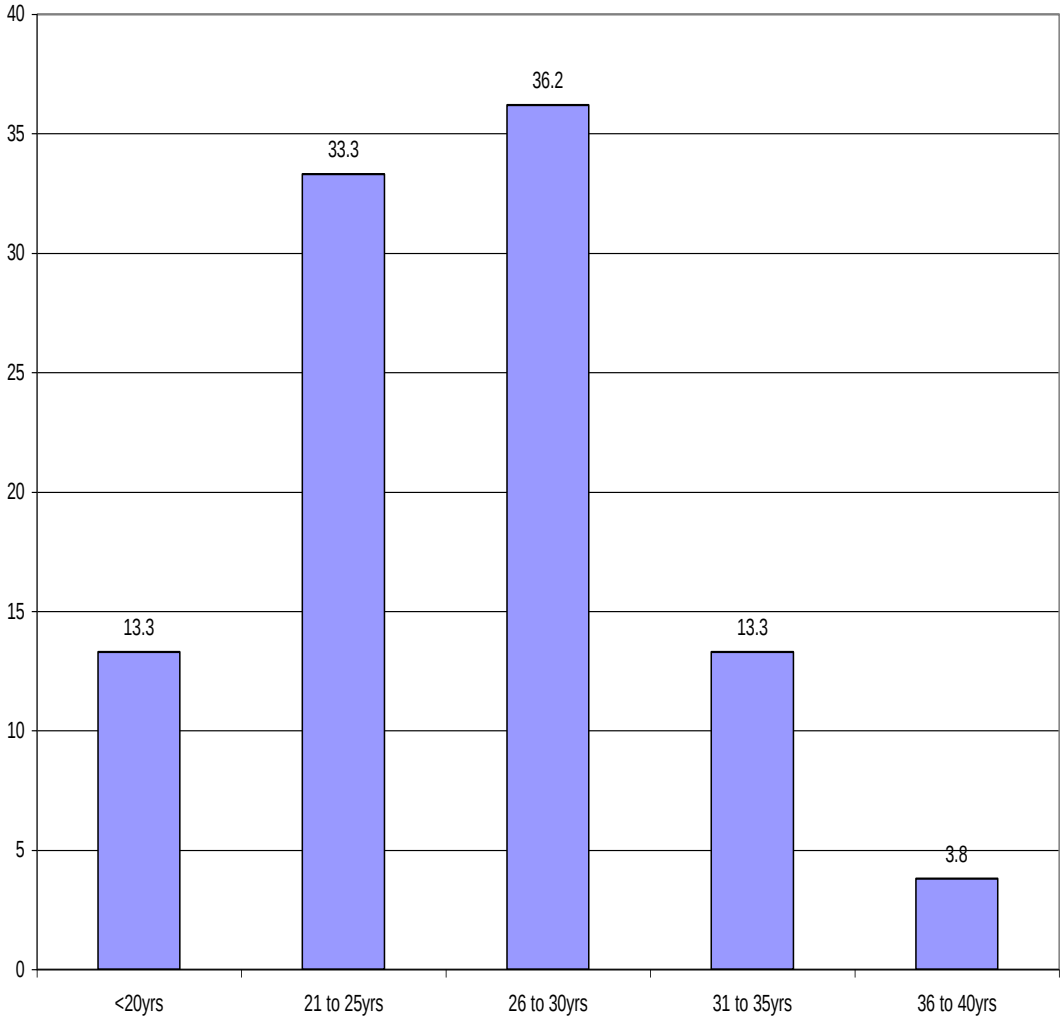
Table: 2

Age of SAMM

Particulars	No.of cases	Percentage
<20yrs	14	13.3
21 to 25yrs	35	33.3
26 to 30yrs	38	36.2
31 to 35yrs	14	13.3
36 to 40yrs	4	3.8
Total	105	100.0

Diagram: 2

Bar chart – Age of SAMM



This table shows, the majority of near miss cases belongs to 26-30 yrs around 38 cases (36.2%), 2nd most common age group ranges from 26-30 yrs showing 35 cases (33.3%).

Table: 3

Socio Economic Status of SAMM

Particulars	No.of cases	Percentage
II	3	2.9
III	62	59.0
IV	38	36.2
V	2	1.9
Total	105	100.0

According to kuppusamy revised scale 2018, socioeconomic class describes

I - Upper

II- Upper Middle

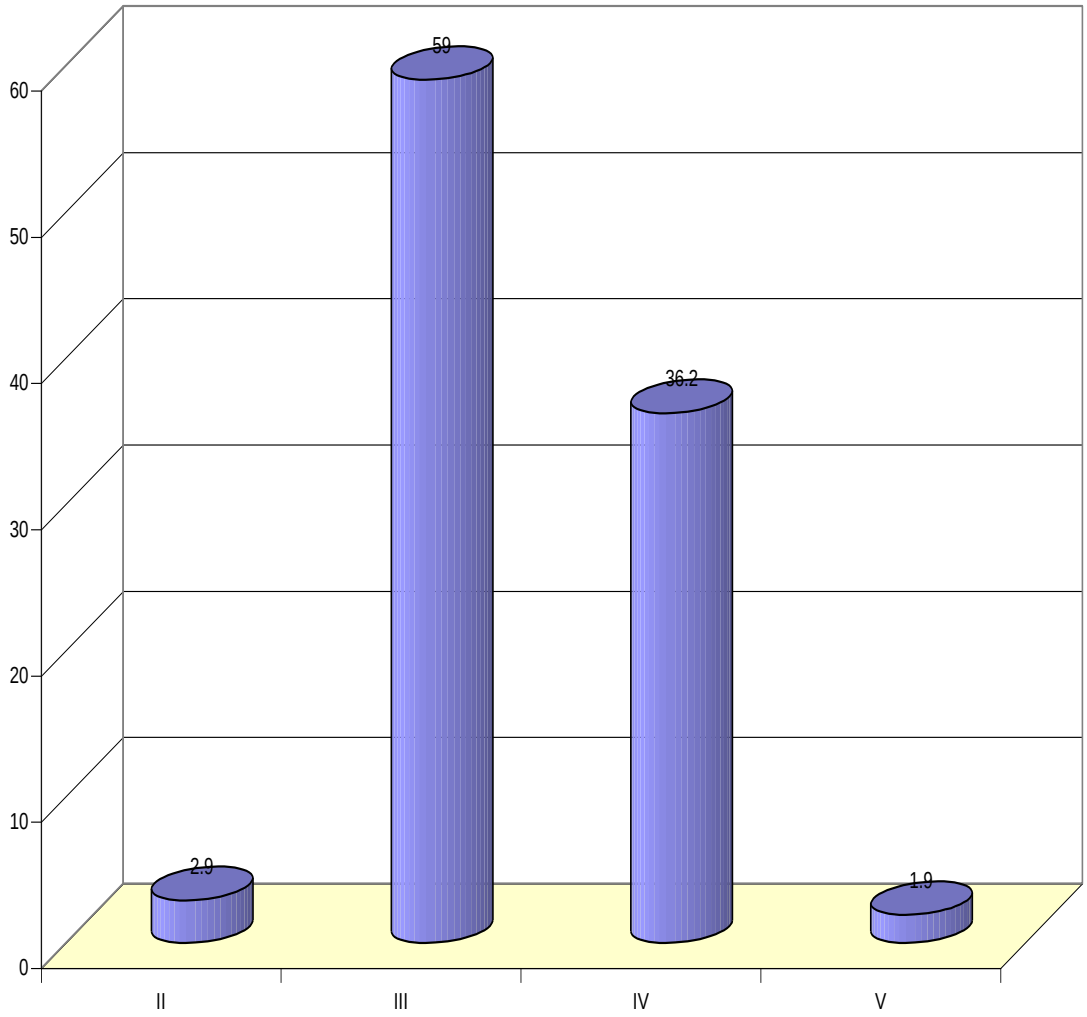
III- Middle / Lower middle

IV -Lower/upper lower

V- Lower

Diagram: 3

Cylinder chart - Socio Economic Status of SAMM



This table explains the frequency of socio economic status. According to Kuppusamy revised scale 2018, majority of study group belongs to SES III (59%), followed by SES IV(38%), SES II(3%), V (2%) respectively.

Table - 4

Chi-square test - Comparison between age and their SES status of SAMM

Age	SES										Statistical inference
	II		III		IV		V		Total		
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	
<20yrs	0	.0%	10	16.1%	4	10.5%	0	.0%	14	13.3%	X^2=15.079 df=12 0.237>0.05 Not Significant
21 to 25yrs	1	33.3%	20	32.3%	13	34.2%	1	50.0%	35	33.3%	
26 to 30yrs	0	.0%	21	33.9%	17	44.7%	0	.0%	38	36.2%	
31 to 35yrs	1	33.3%	9	14.5%	3	7.9%	1	50.0%	14	13.3%	
36 to 40yrs	1	33.3%	2	3.2%	1	2.6%	0	.0%	4	3.8%	
Total	**3**	**100.0%**	**62**	**100.0%**	**38**	**100.0%**	**2**	**100.0%**	**105**	**100.0%**	

Table – 5

Descriptive statistics

	Age	GA	ICU Stay	Total Stay
N	105	92	105	105
Missing	0	13	0	0
Mean	26.11	30.54	11.01	22.63
Median	26.00	34.00	11.00	20.00
Std. Deviation	4.583	10.163	6.190	9.241
Minimum	19	0	4	10
Maximum	40	38	42	60

In this table, the age corresponding to minimum of 19 to the maximum 40, showing mean value around 26.11, the standard deviation is 4.58. The total hospital stay, minimum of 10 days to the maximum of 60 days., the mean value shows 22.63. In our study the ICU stay ranges from 4 days to 42 days, the mean value is 11.

Diagram: 4

Cone chart - Descriptive statistics

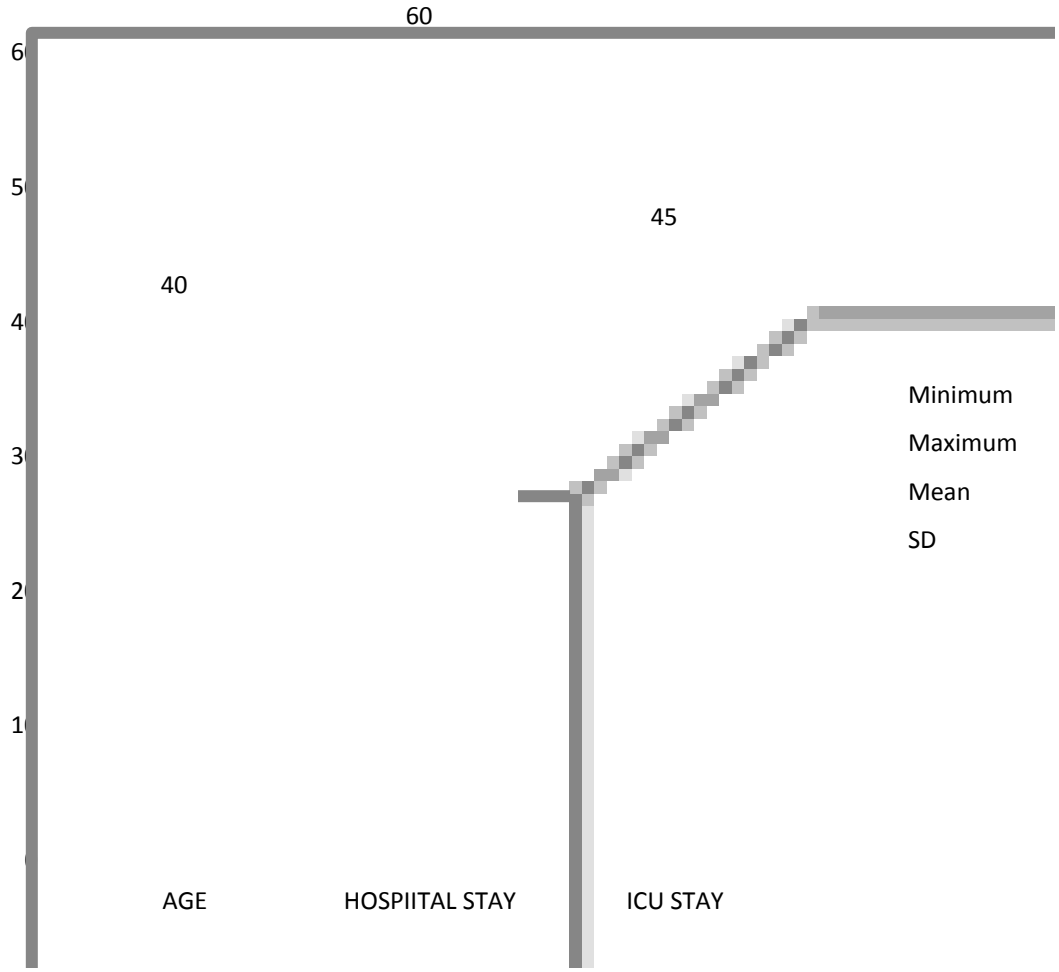


Table :6

Causes of SAMM

Particulars	No.of cases	Percentage
GHTN	46	43.8
Haemorrhage	44	41.9
Sepsis	4	3.8
Viral fever	3	2.9
Anaemia	2	1.9
RHD	3	2.9
AFLP	1	1.0
CPM	1	1.0
CHD	1	1.0
Total	105	100.0

In this study, this table contains the core content, in which GHTN cases were the maximum in number around 46 cases, showing 43.8%. Following haemorrhage shows 44 cases, 41.9%. Next comes sepsis 4 cases (3.8%), RHD 3 cases (2.9%),viral fever 3 cases(2.9%), anaemia 2 cases (1.9%), CHD 1 case (1%), AFLP 1 case (1%), central pontine myelinosis 1 case (1%). Hence, GHTN occupies the first major cause of SAMM, followed by haemorrhage leads to the 2nd place, sepsis carries 3rd place for the SAMM cases.

Diagram: 5

Bar chart – Causes of SAMM

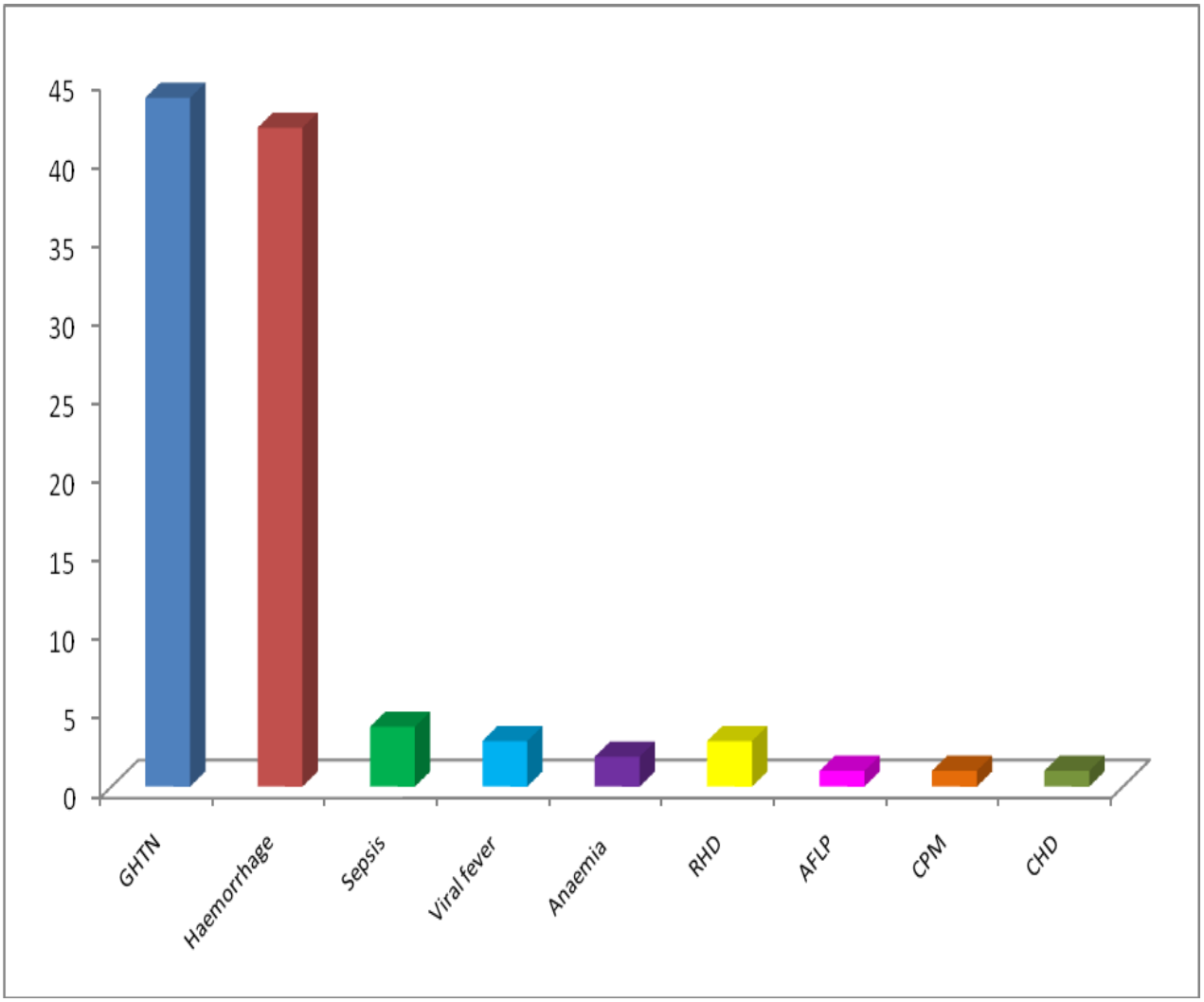


Table: 7

Diagnosis of SAMM

Causes	Diagnosis	No.of cases	Percentage
1.GHTN	AP Eclampsia	16	15.2
	Abruptio Placenta	15	14.3
	HELLP	11	10.5
	Pulmonary Edema	8	7.6
	PP Eclampsia	3	2.9
	Total	**53**	**50.47**
2.Haemorrhage	Atonic PPH	14	13.3
	Bleeding Placenta Previa	11	10.5
	Ruputre Ectopic	12	11.4
	Total	**37**	**35.23**
3.Others	Sepsis	4	3.8
	Fever	3	2.9
	RHD	3	2.9
	Acyanotic Heart Disease	1	1.0
	AFLP	1	1.0
	Anaemia	2	1.9
	CPM	1	1.0
	Total	15	14.2
	Grand Total	**105**	**100.0**

As we already discussed in the previous table, that the GHTN was the leading cause of near miss cases, followed by haemorrhage and sepsis. This table elaborately, explains the frequency & percentage of GHTN induced high risk sequalae causing near miss cases such as AP eclampsia, Abruption, HELLP, pulmonary edema and also the major haemorrhagic causes like Atonic PPH, Bleeding placenta previa, Rupture ectopic are depicted clearly.

Among this GHTN induced near miss cases, AP eclampsia leading the first place showing frequency of 16 cases& 15.2%, followed by Abruption shows 2nd leading cause that is 15 cases & 14.3%, 3rd cause was HELLP around 11 cases & 10.5%, 4th comes pulmonary edema has 8 cases & 7.6%, Last was PP eclampsia shows 3 cases & 2.9%.

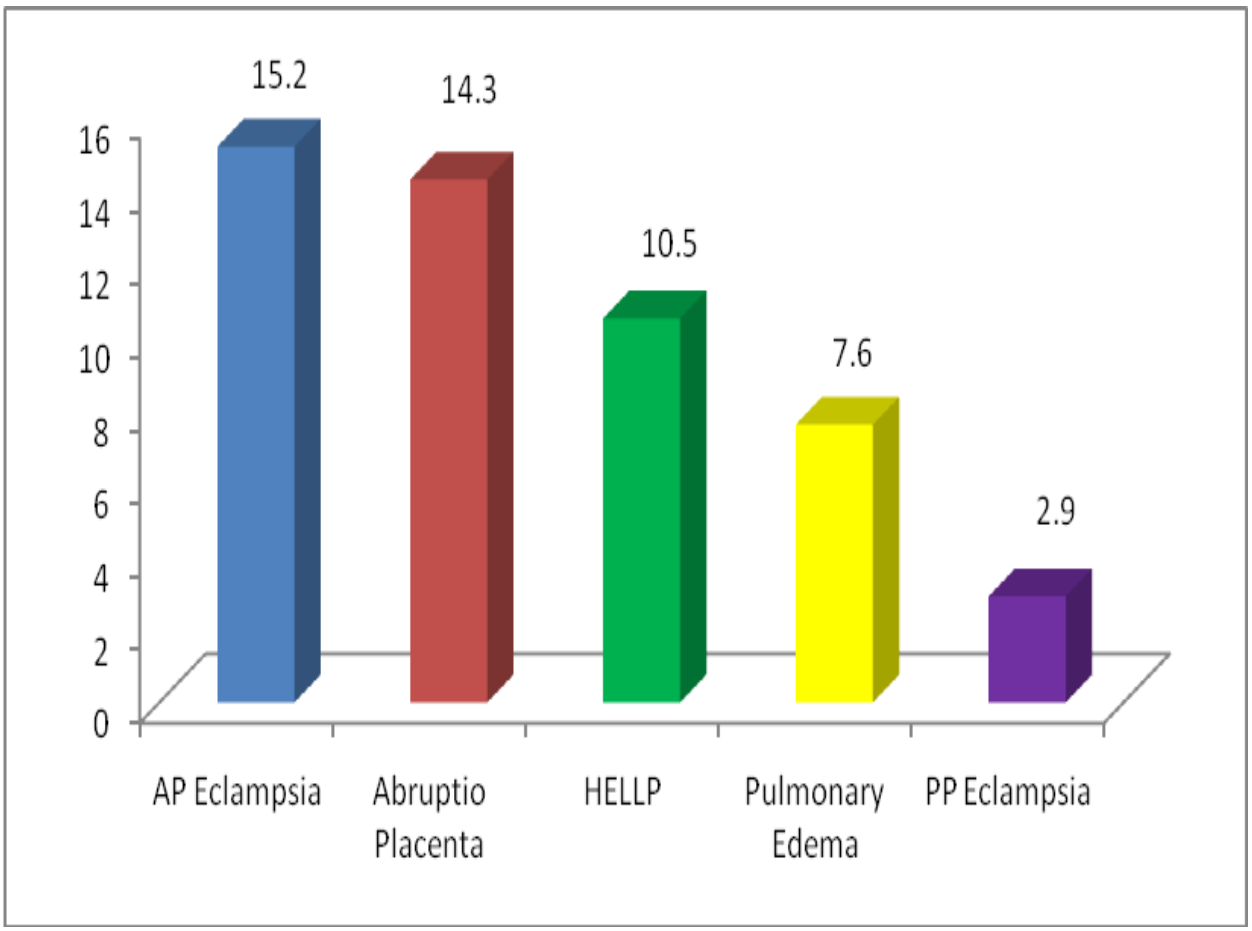
Haemorrhage plays the second leading cause for SAMM. Atonic PPH is the first major cause for haemorrhage showing frequency of 14 cases & 13.3%, followed by bleeding placenta previa 11 cases & 10.5%, ruptured ectopic 12 cases & 11.4% resp.,

In this study group, sepsis occupies 3rd place showing 4 cases & 3.8%, followed by fever 3 cases & 2.9%, RHD has 3 cases & 2.9%, anaemia 2cases & 1.9%, acyanotic heart disease 1%,AFLP 1%, CPM 1%.

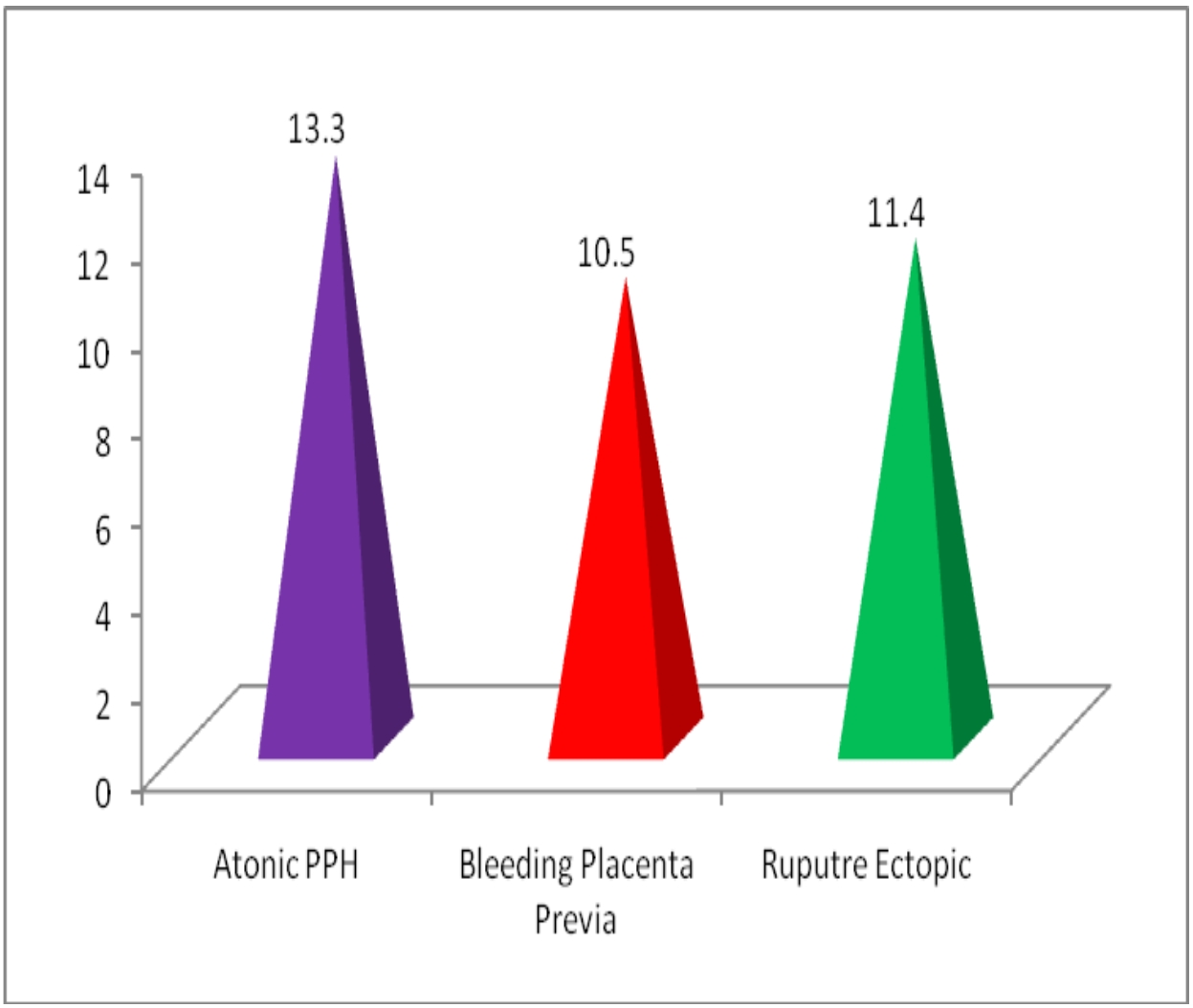
Diagram: 6

Diagnosis of SAMM

a. GHTN



B. HAEMORRHAGE



c. Others

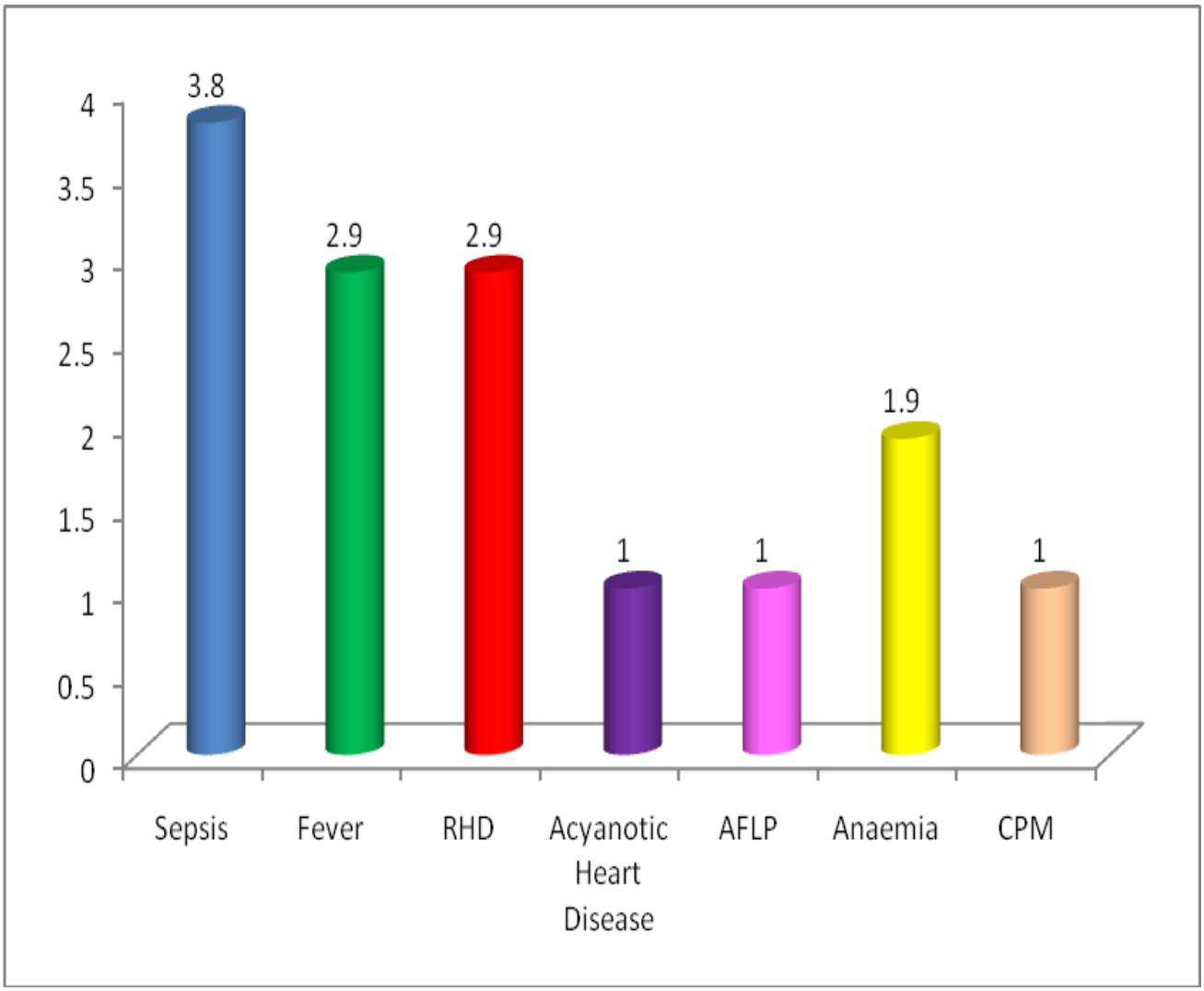

4
3.5
3
2.5
2
1.5
1
0.5
0
3.8
2.9
2.9
1
1
1.9
1
Sepsis
Fever
RHD
Acyanotic Heart Disease
AFLP
Anaemia
CPM

Table: 8

Oneway ANOVA 'f' test difference between causes and their ICU stay

ICU Stay	n	Mean	S.D	Min.	Max.	Statistical inference
AP Eclampsia	16	11.50	8.626	5	42	F=3.821 .000<0.05 Significant
HELLP	11	9.36	3.009	5	15	
Abruptio Placenta	15	11.60	3.376	6	18	
Pulmonary edema	8	12.38	3.701	7	18	
Atonic PPH	14	8.43	3.155	3	13	
Bleeding Placenta Previa	11	11.64	8.213	5	28	
Ruputre Ectopic	12	8.75	3.596	5	17	
Sepsis	4	10.75	3.862	7	15	
Fever	3	14.67	2.082	13	17	
RHD	3	7.67	1.528	6	9	
Acyanotic Heart Disease	1	14.00	.000	14	14	
AFLP	1	32.00	.000	32	32	
Anaemia	2	12.50	.707	12	13	
CPM	1	38.00	.000	38	38	
PP Eclampsia	3	8.67	4.041	5	13	
Total	105	11.01	6.190	3	42	

Table :9

Admitted with Disorder

Particulars	No.of cases	Percentage
Admitted with Severe illness	92	87.6
Admitted with no disorder and became near miss	9	8.6
Admitted with disorder and became near miss	4	3.8
Total	105	100.0

In this study place, the increased frequency of near miss cases was found to be admitted with severe illness showing frequency of 92 cases (87.6%), admitted with no disorder and became near miss around 9 cases (86%), admitted with disorder and became near miss was 4 cases(38%).

Table: 10

Places of Referrals

Particulars	No.of cases	Percentage
GH	21	20.0
PHC	76	72.4
PVT	1	1.0
Self	7	6.7
Total	105	100.0

At KAPV govt. medical college (study place), many of the near miss cases was referred from PHCs about 76 cases (72.4%), from GH 21 cases (20%), self (6.7%), private hospital 1%.

Diagram: 7

Cylinder chart - Places of Referrals

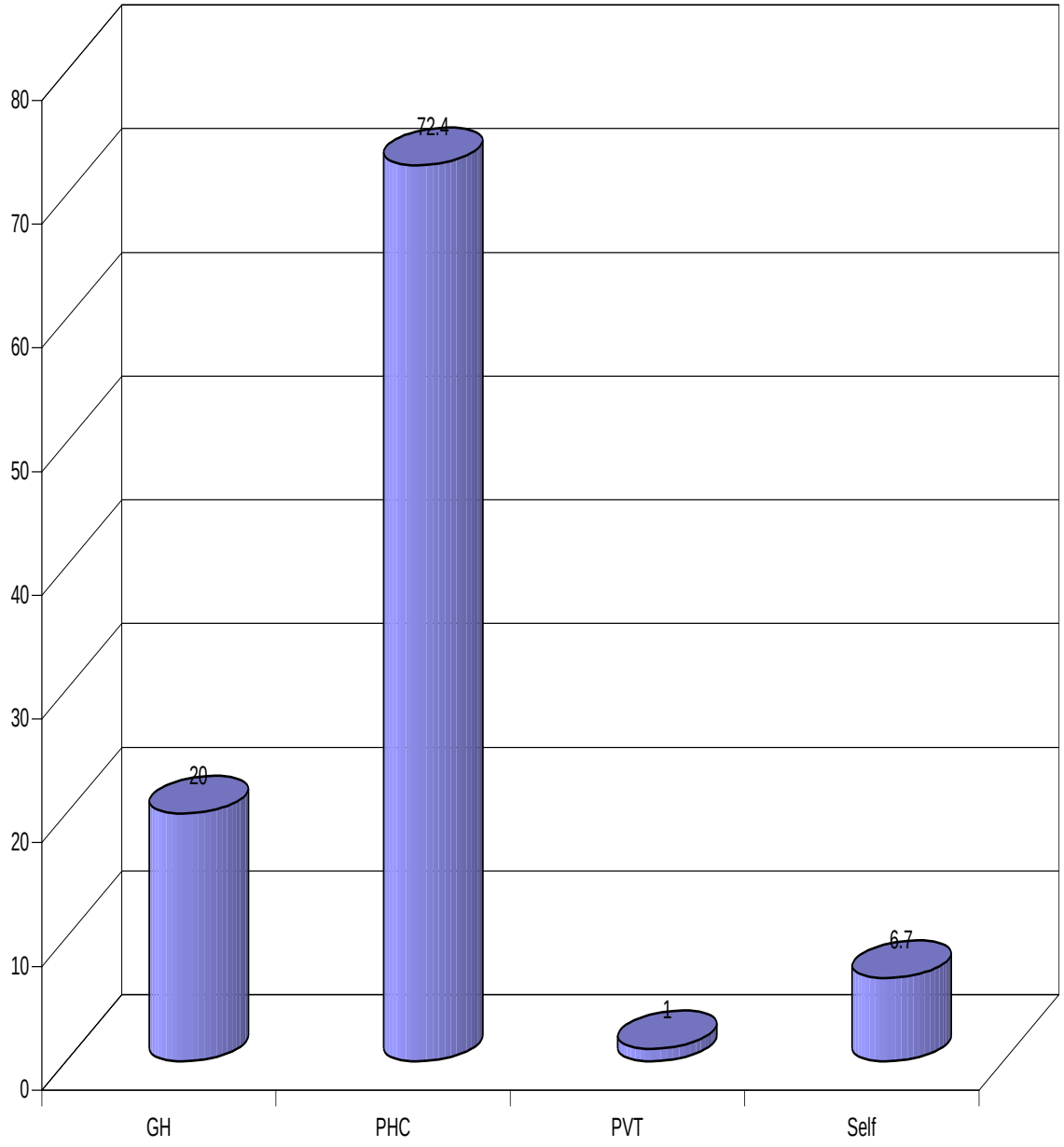


Table: 11

Gravidas at SAMM

Particulars	No.of cases	Percentage
Primi	41	39.0
Multi	51	48.6
PN	13	12.4
Total	105	100.0

In this table, 51 cases (48.6%) of SAMM cases were multi gravida, 41 cases (39%) were primi, PN mothers were 13 cases (12.4%).

Diagram: 8

Pie chart - Gravidas at SAMM

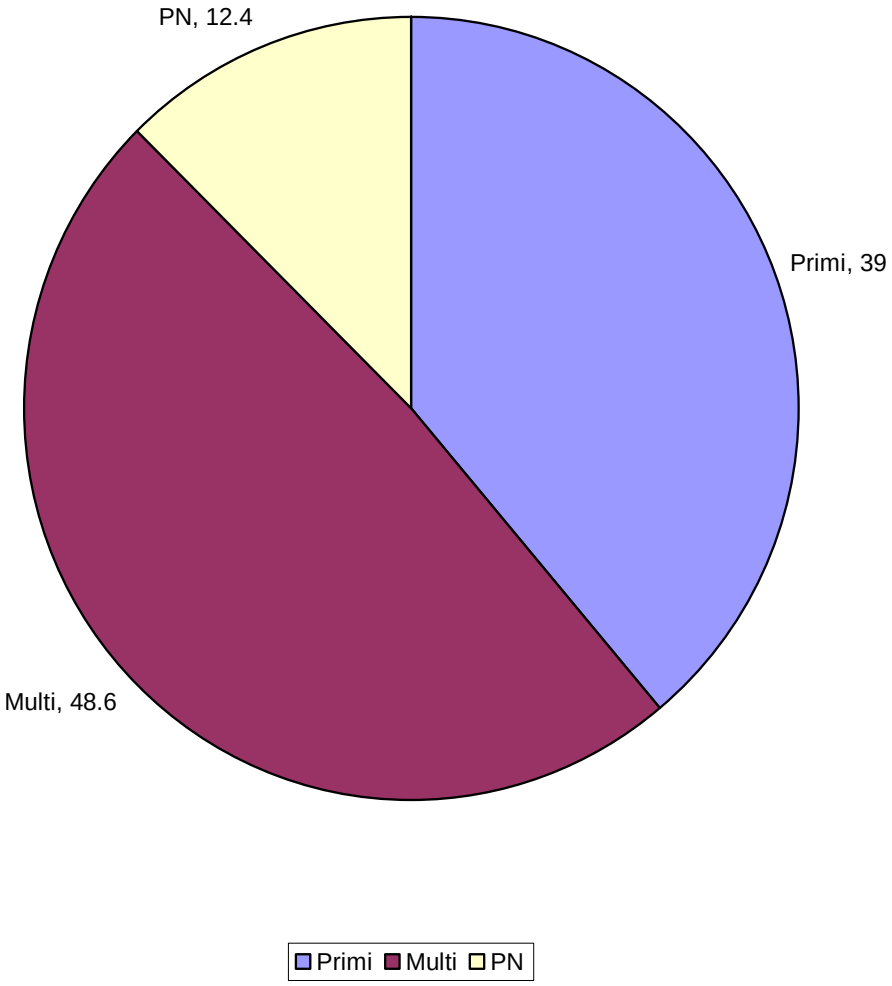


Table : 12

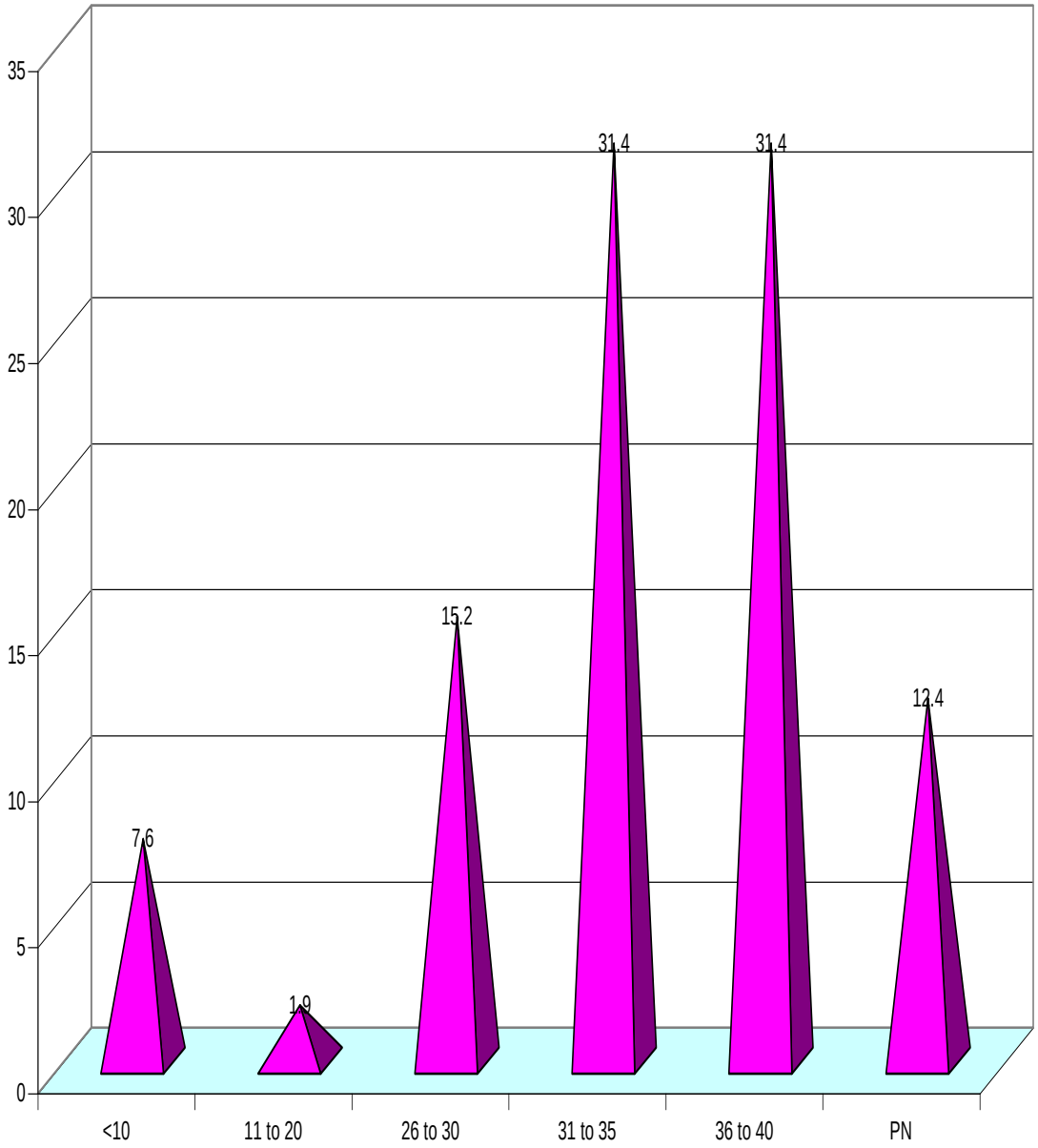
Gestational age of SAMM

Particulars	No.of cases	Percentage
<10wks	8	7.6
11 to 20wks	2	1.9
26 to 30wks	16	15.2
31 to 35wks	33	31.4
36 to 40wks	33	31.4
PN	13	12.4
Total	105	100.0

According to this table, many of near miss cases belongs to both second and third trimester. 33 cases(31.4%) shows 31-35 weeks, another 33 cases (31.4%)shows 36 -40 wks., 26 t0 30 wks 16 cases(15.2%), < 10 wks 8 cases(7.6%), 11 to 20 wks 2 cases(1.9%), PN cases 13(12.4%). From this table, around 66 cases were belongs to 31-40 wks.

Diagram: 9

Triangle chart - Gestational age of SAMM



RESULTS

During the period of audit, there were a total of 18,207deliveries & 15,202 live births, 105 near miss cases & 65 maternal deaths at MGMGH, KAPV govt medical college. Multiparas were more in this study group. The percentage of multigravida was 48.6%, whereas primi belongs to 39% given in table 11. Majority of the patients (31.4%) were in both second & third trimester at near miss events explained in table 12.

A total 635 potentially life threatening complications were identified of which 105 near miss cases are found at MGMGH, Kapv govt medical college during the study period. Maternal near miss incidence ratio is 5.7 / 1000 live births. Maternal near miss to mortalty ratio is 1.6. The mortality index is 38%. Among the cases of near miss in this study group, Hypertensive is found to be one of the most leading cause, followed by haemorrhage, in this study which is clearly explained in table 6,7.

The maternal near miss incidence ratio was 5.7 /1000 live births which is very less compared to other study group. Studies done in developing countries varies from 5-40/1000 live births. The study conducted at RSRM, Stanely shows nearmiss incidence rate of 12/ 1000 live births. The maternal mortality rate in TN is 66 / lakh live births at 2016.

Ours is a tertiary care referral centre covering three districts in & around trichy., with most of these cases being refered in an already moribund state. Majority of the near miss cases belongs to SES III (table 3), the literacy rate among the study group are from 6^{th} to 12^{th} (table1). The table

1 implies that the frequency of literacy rate from 6^{th} to 12^{th} std shows 85 cases and they all have poor maternal health education & unaware of symptoms occurring in high risk cases during pregnancy. Some have reluctancy towards high risk symptoms. Lack of awareness among the study population, shows increased frequency of 40 cases(38%), delay in referral was 20 cases (18%), according to the table 21. Lack of awareness is the major associated factors in this study.

The delay in referrals due to lack of blood, are also associated factors for cause of morbidity & mortality. Delayed diagnosis, delayed referals, & inadequate utilization of resources might have been the cause for morbidities & mortalies in our study. Along with increased awareness of ones own health, health education may go a long way in improving the quality of obstetric care.

Table :13

Mode of delivery of SAMM

Particulars	No.of cases	Percentage
Emergency Hystrectomy	22	21.0
Emergency Hysterotomy	3	2.9
Emergency Laparatomy	11	10.5
Emergency LSCS	45	42.9
LN	24	22.9
TOTAL	105	100

This table shows maximum of Emergency LSCS 45 cases(42.9%), due to early interventions , C-section done for the prevention of morbidity and mortality among high risk cases. Due to failed medical management and failure in devascularisation surgical procedures, many cases end up in Emergency hysterectomy. The frequency in this study shows 22 cases of Emergency hysterectomy (21%)., Emergency laparatomy was 11 cases (10.5%), labour natural was 24 cases (22.9%).

Diagram: 10

Cone chart -Mode of delivery of SAMM

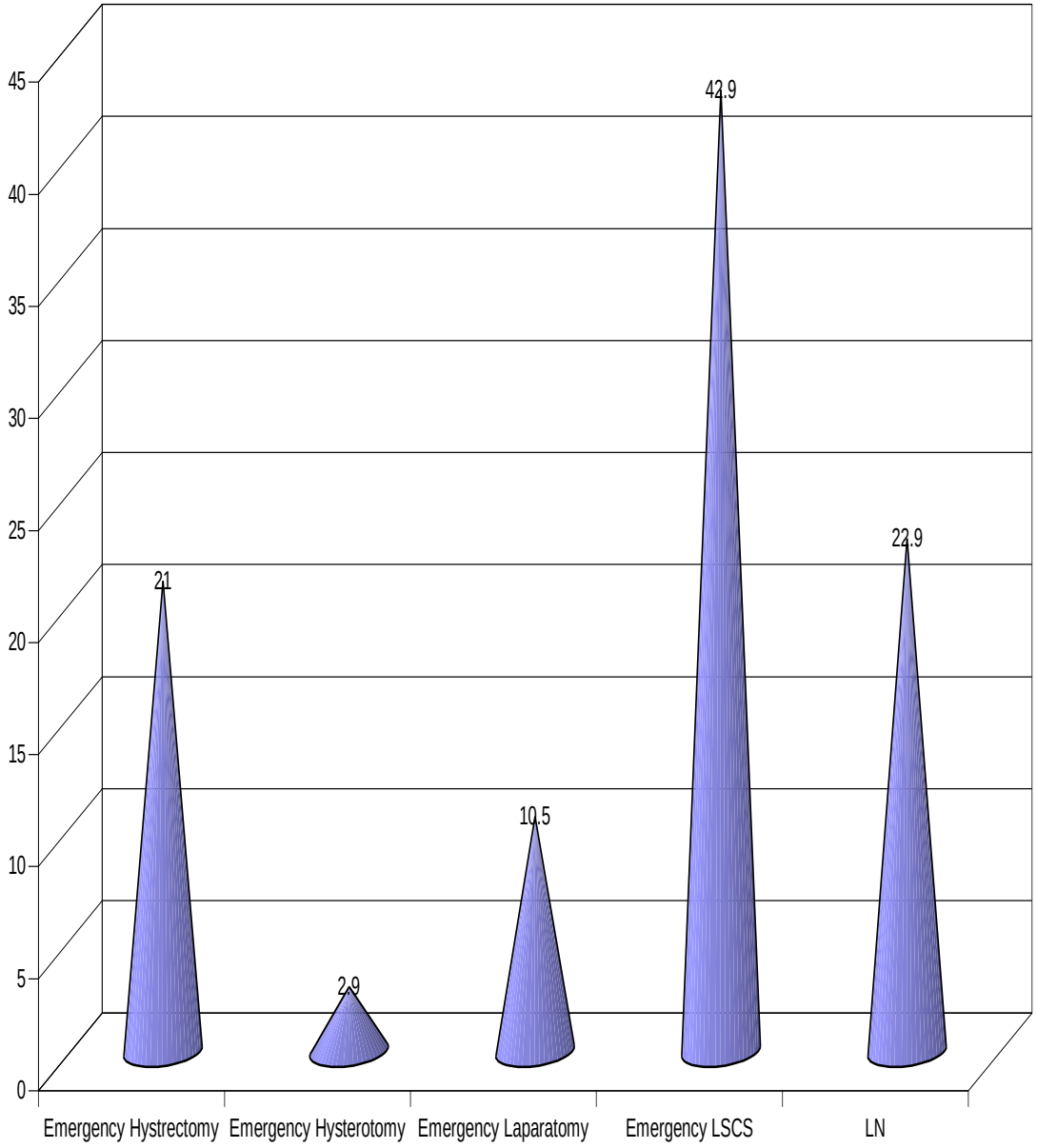


Table :14 - Cross tabulation between Age of SAMM cases and mode of delivery

Age	Mode of Delivery												Statistical inference
	Emergency Hystrectomy		Emergency Hysterotomy		Emergency Laparatomy		Emergency LSCS		LN		Total		
	n	*%*	*N*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	
<20yrs	1	4.5%	1	33.3%	0	.0%	4	8.9%	8	33.3%	14	13.3%	X^2=34.809 Df=16 .004<0.05 Significant
21 to 25yrs	9	40.9%	0	.0%	2	18.2%	21	46.7%	3	12.5%	35	33.3%	
26 to 30yrs	5	22.7%	2	66.7%	6	54.5%	14	31.1%	11	45.8%	38	36.2%	
31 to 35yrs	5	22.7%	0	.0%	3	27.3%	6	13.3%	0	.0%	14	13.3%	
36 to 40yrs	2	9.1%	0	.0%	0	.0%	0	.0%	2	8.3%	4	3.8%	
Total	22	100.0%	3	100.0%	11	100.0%	45	100.0%	24	100.0%	105	100.0%	

Since, the p value shows < 0.05, the study is significant.

Table: 15

Blood Transfusion

Particulars	No.of cases	Percentage
No	18	17.1
Yes	87	82.9
Total	105	100.0

Diagram: 11

Pie chart - Blood Transfusion

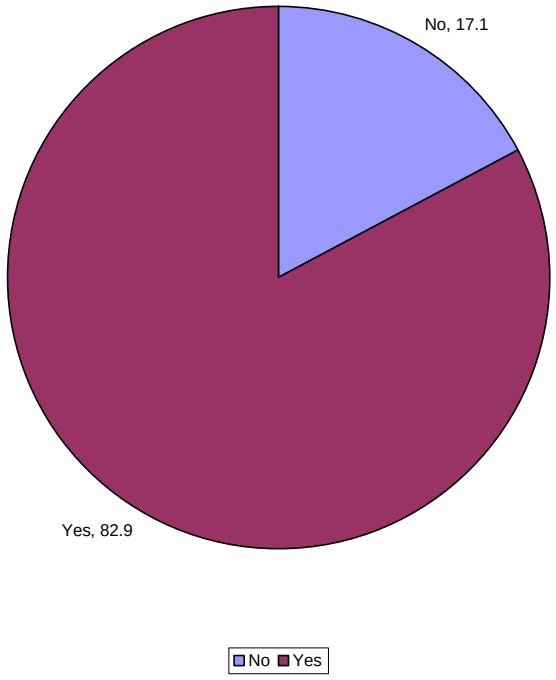


Table: 16

Intervention done at SAMM

Particulars	No. of cases	Percentage
MV & Blood Products	25	23.8
MV	26	24.8
Higher Antibiotic	5	4.8
Platelets	3	2.9
Blood & Blood Products	46	43.8
Total	105	100.0

Diagram: 12

Triangle chart - Intervention done at SAMM

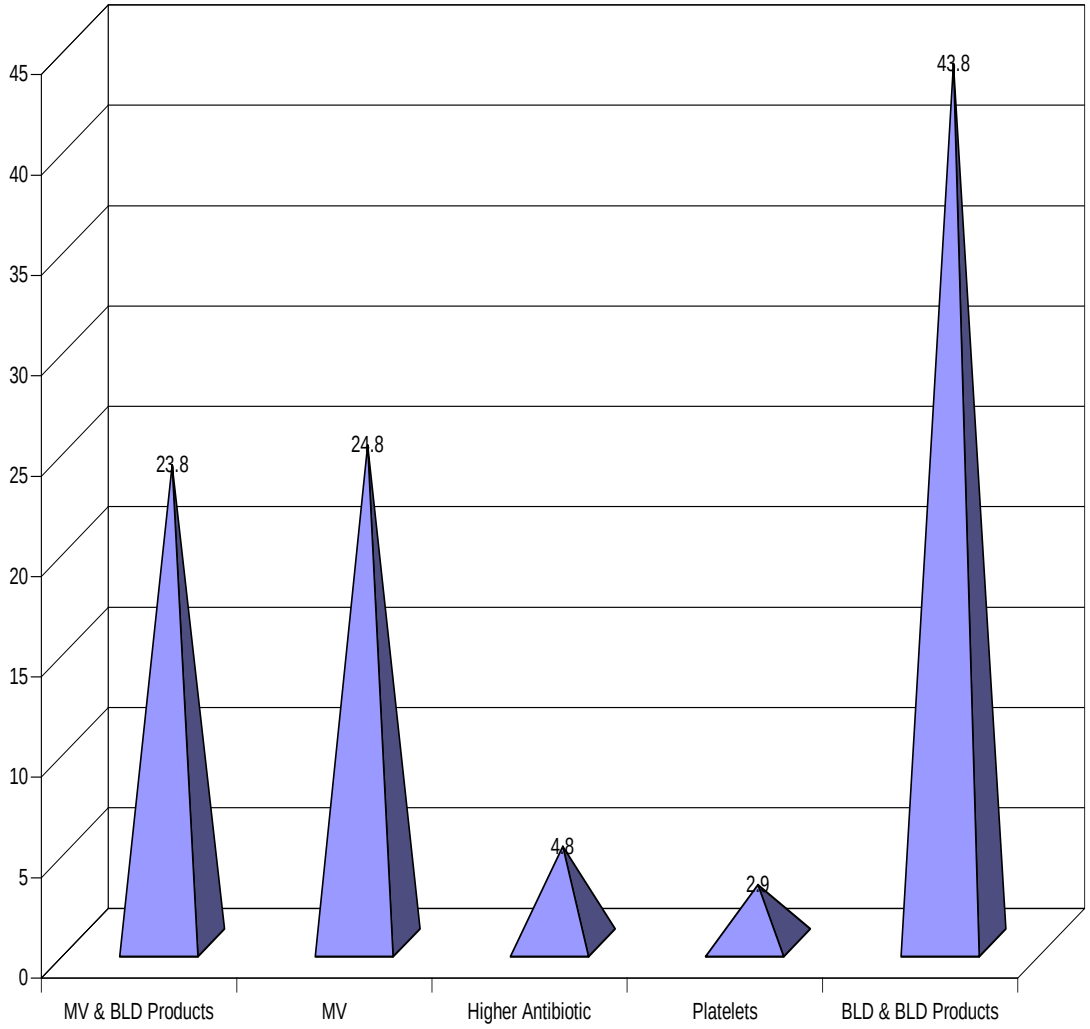


Table: 17

Blood and Blood products

Particulars	No.of cases	Percentage
Packed Cell	18	17.1
Blood, FFP Cryo	20	19.04
Blood, FFP, Platelets	15	14.2
FFP	2	1.9
FFP/ Platelets	8	7.6
Whole blood	31	29

Diagram: 13

Cylinder chart - Blood and Blood products

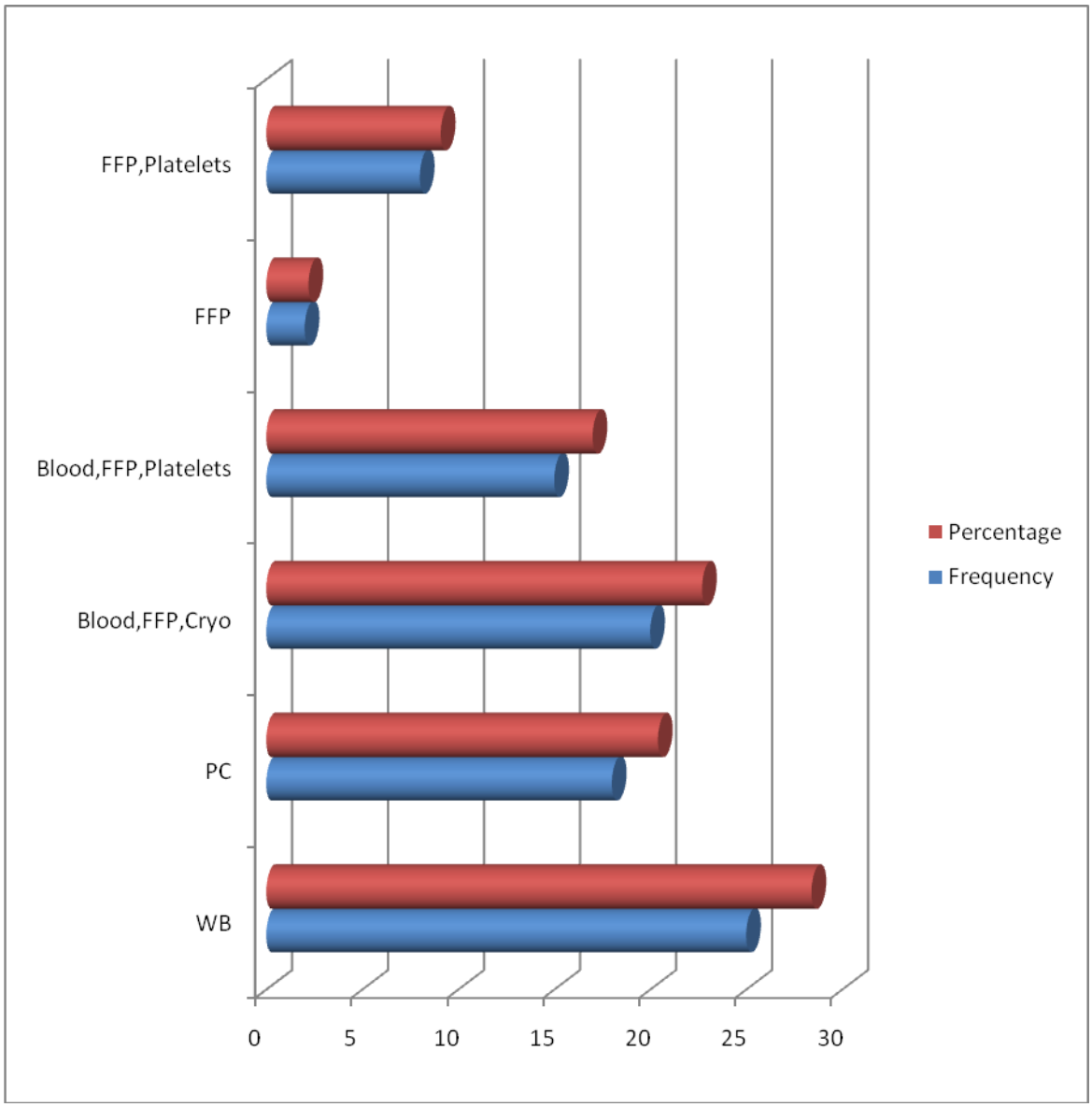


Table: 18

Means of Transport

Particulars	No.of cases	Percentage
108 ambulance	96	91.4
Public Transport	5	4.76
Personal Vehicle	2	1.9
Others	2	1.9

Diagram: 14

Bar chart - Means of Transport

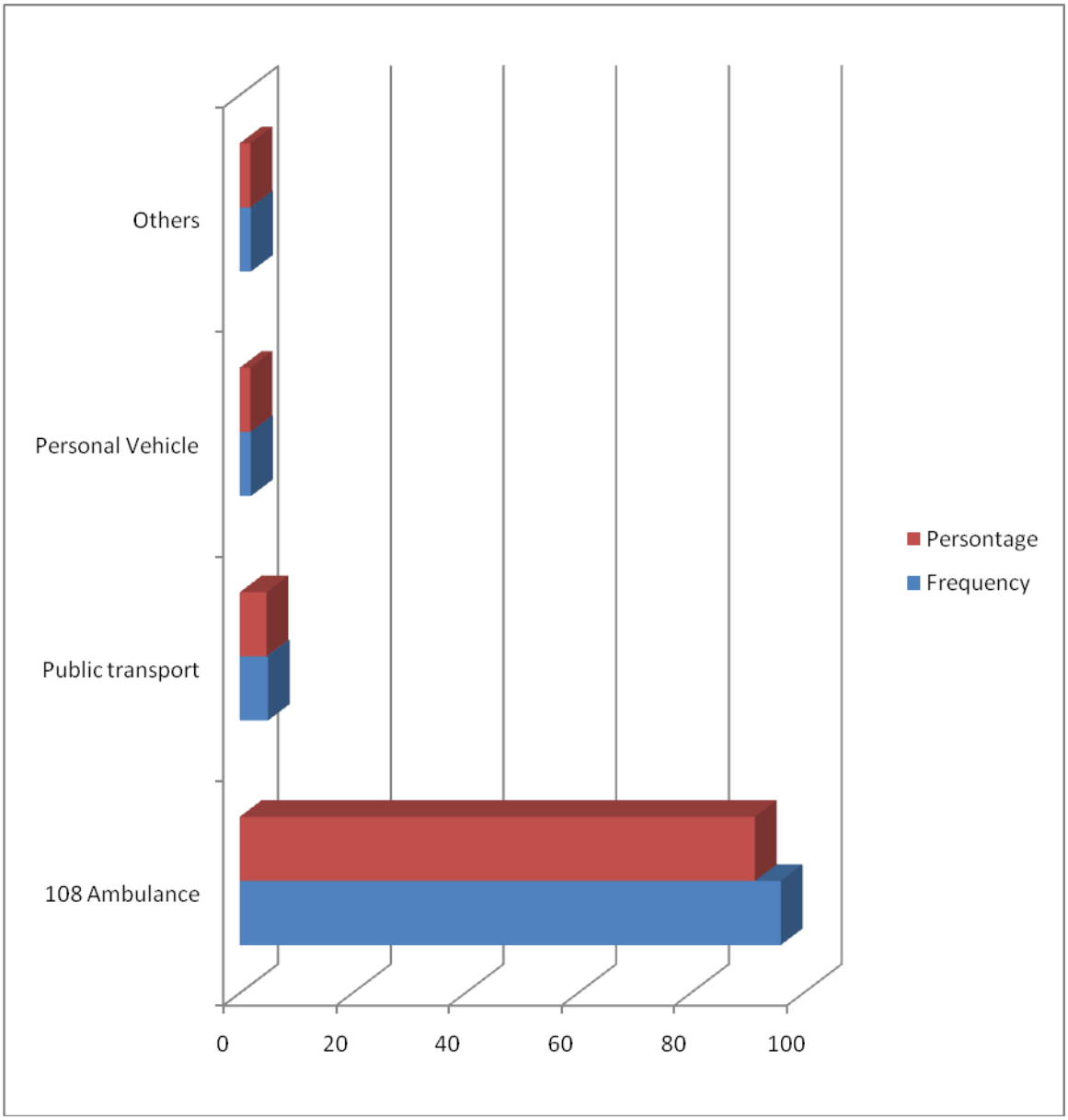


Table: 19

Cases of SAMM

Particulars	No.of cases	Percentage
Before Arrival	96	91.42
During Hospitalization	9	8.57

Diagram: 15

Pie chart - Cases of SAMM

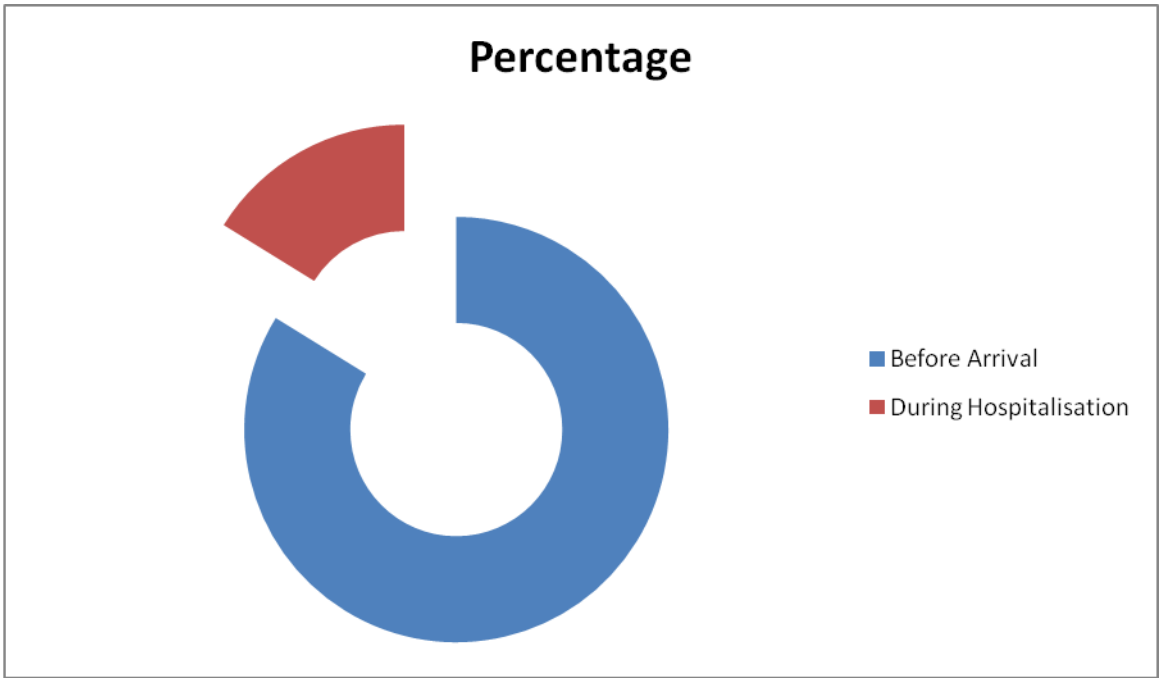


Table: 20

Organs involved in SAMM

Particulars	No.of cases	Percentage
Brain	30	28.6
Heart	3	2.9
Kidney	2	1.9
LIver	9	8.6
Lungs	9	8.6
MODS	2	1.9
Coagulation	21	20.0
Uterus, Coagulation	27	25.7
Spleen	2	1.9
Total	105	100.0

Diagram: 16

Triangle chart – Organs involved in SAMM

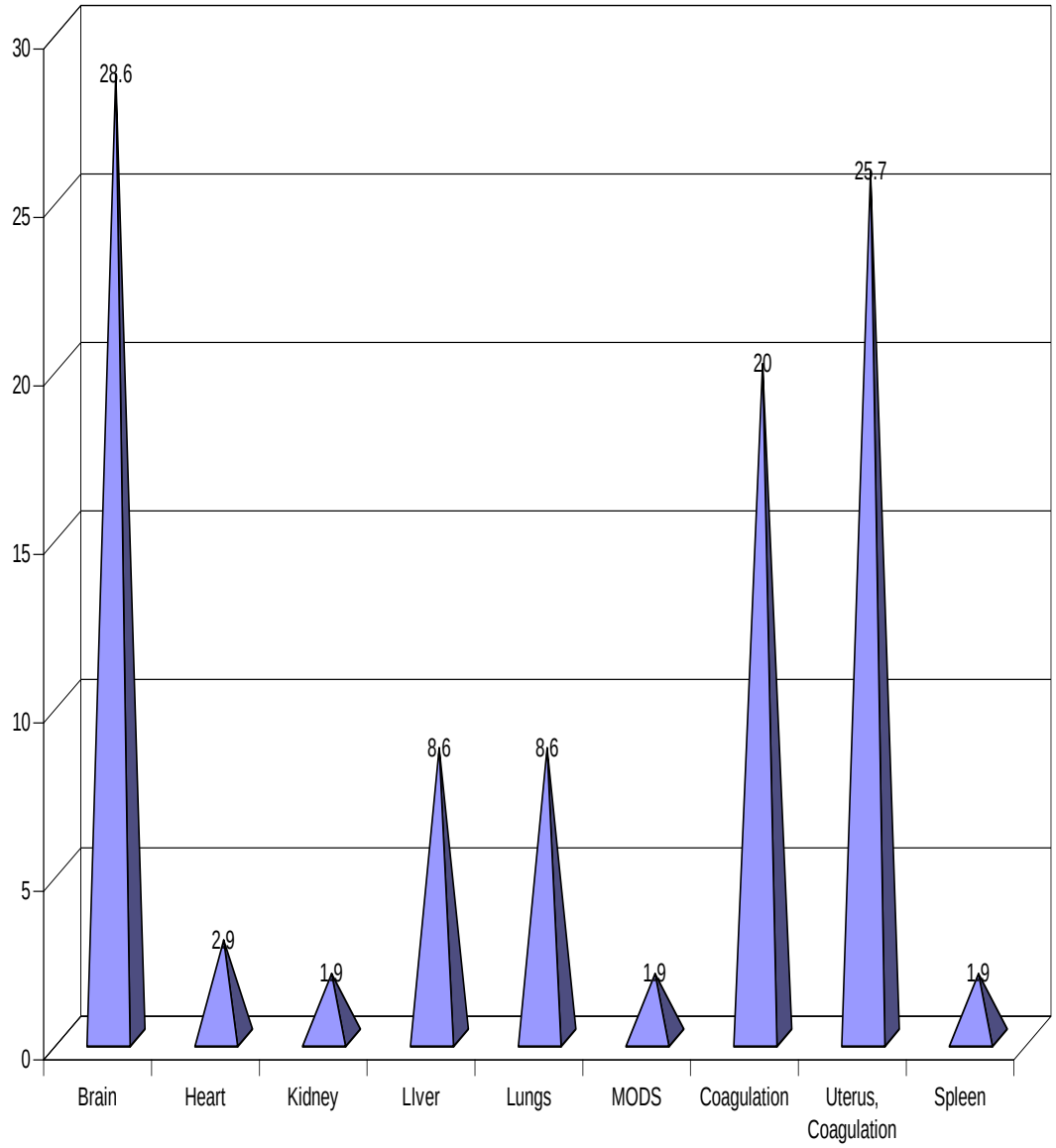


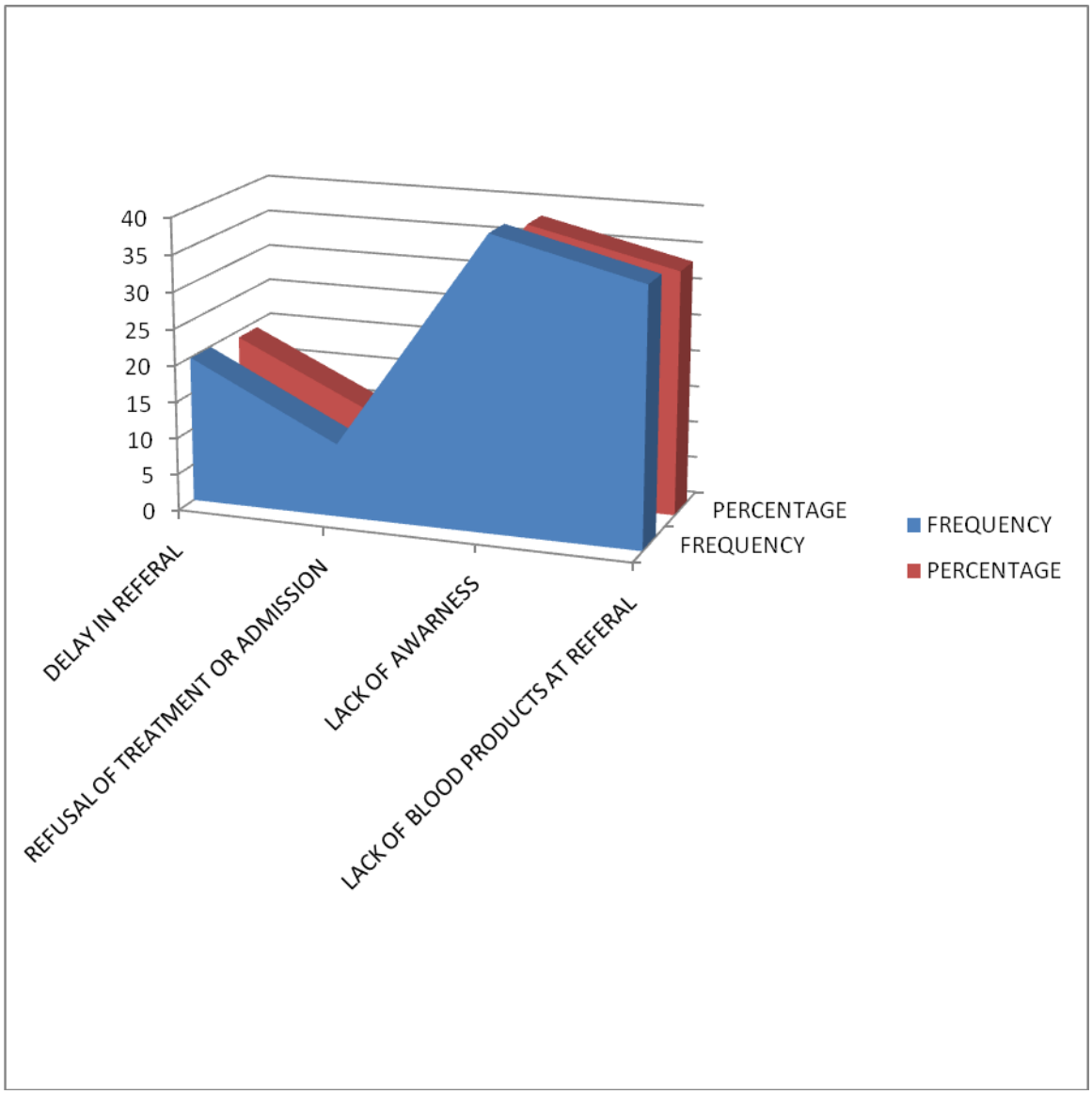
Table: 21

Additional Factors

Particulars	Frequency	Percentage
Delay in Referral	20	19.04
Refusal of treatment or admission	10	9.52
Lack of Awareness	40	38.09
Lack of Blood products at referral	35	33.33

Diagram: 17

Angle chart – Additional Factors



Incidence of SAMM, during the study period, a total of 105 maternal near miss cases and 15,202 live births were reported in our hospital which produced total maternal near miss ratio of 5.7per 1000 live births. Many of the study population belong to low socio economic state as per table 3.

The reported incidence of maternal near miss varies in different studies and range from (<1to82 per thousand live births). For some instances, the rate ranged between 0.14% &0.75% in some high income countries and it ranged between 1.5% to 7.7% in some middle income countries. World wide hypertensive disease of pregnancy, obstetric hemorrhage and sepsis have been major causes of maternal near miss.[23,24]

Characteristics of women with SAMM:

The majority of 93.3% of SAMM cases were referred from other health facilities from which 91.4% 108 ambulance was used by most of the mothers as a means of transport to the study hospital at MGMGH as per (Table-18).A significant number 91.4% of near misses occurred before arrival at the participating hospitals. Only 8.57% of cases became near miss during hospitalization. (table 19).

Anaemia plays a major underlying contributing cause of maternal nearmiss cases. It is due to the major fact for the occurrence of abruption, atonicity etc., This finding is also comparable with middle income countries. Such as Iraq ,Nepal, other states of India and Pakistan. [26,27,28]

Organ Dysfunction in SAMM Cases:

The number of major organ dysfunction seen in majority of SAMM cases were neurological at 30 cases (28.6%), uterus &coagulation at 25.7% & hematological at 21(20%), respiratory dysfunction at 9 cases (8.6%), cardiovascular at 3 cases (2.9%), hepatic dysfunction 8.6%,and renal dysfunction, were the least reported organ dysfunction in our audited SAMM cases as 1% (table 20).

Underlying and Contributory Causes of SAMM:

The underlying cause for the majority of near miss cases were hypertensive disorder in total 46 cases(43.8%),including AP eclampsia 16 cases (15.2%) and, Abruptio placenta 15 cases(14.3%), HELLP 11 cases (10.5%), acute pulmonary edema 8 cases(7.6%),PP eclampsia 3 cases(2.9%), followed by obstetric haemorrhage 44(41.9%)followed by sepsis 4(3.8%).,(table 5,6)

DISCUSSION

During this study period, the SAMM incidence was 5.7 per 1000 live births in our study hospital. we used newly developed WHO criteria which are very stringent and would identify only critical cases. However previous studies used disease based criteria which are less stringent than the WHO criteria.

From our attempts to harmonize the definition used in far studies available, the incidence or prevalence ratio of maternal near miss ranges from 1.1 - 10.1 % & case fatality ratio indicating wide variation in reported magnitude of the problem. In our study, maternal near miss incidence ratio belongs to 5.7 per thousand live births. Case fatality ratio is 6%.

For studies that includes clinical signs & symptoms, hypertensive disorders, haemorrhage, sepsis were the commonest definition used. The percentage of HT disorder 43.8%, haemorrhage (41.9%),sepsis 4% resp., according to this study explained in the (table 6)

For studies, that employed the management based criteria, for defining a maternal near miss, emergency hysterectomy & administration to intensive care units, where the commonest procedures employed. According to this study, emergency hysterectomy 21%, emergency hysterotomy 3%, emergency laparotomy 10.5%, emergency lscs 42.9%, labour natural, spontaneous expulsion 22.9% rep.,other management based criteria includes emergency postpartum hysterectomy & prolonged hospitalization for more than four days.

In this criteria, indicators of severity of blood loss such as hypo volumeia requires massive blood transfusion given in table 16, 17, severe anaemia with hypotension (requiring intensive resustitation) are used as proxy indicators for maternal near miss. This is dependent on the fact that utilization of high dependency obstetric care facilities or massive or prolonged resuscitation indicates a critically ill patient whether in pregnancy, labour or postpartum.

In this study, total blood transfusion requires 64.7%,usage of whole blood 29%, packed cells 17.1%, FFP & blood-19.04%, FFP& Platelets -7.6%, FFP- 1.9% as per table 16,17.

The justification of the organ system dysfunction based criteria, proposed by mantel et al is that women with organ / system dysfunction are likely to occur, unless adequate & prompt care is provided .for instances, obstetric haemorrhage constitutes a maternal near miss through vascular (hypovolumeia), renal (oliguria), coagulation dysfunction. In this study, the organ dysfunction explained previously ,given in table 20.

The majority of maternal near miss cases have already occurred on the women's arrival at the participating hospitals, a finding which is in line with studies from most developing countries. For example in Bolivia, Mozambique, Somalia were 74%,70%,74.2% of near miss cases resp., were in a critical state arrival at the health facilities, implying the need to focus on pre hospital barriers[30,31],.However, near miss cases that develop during hospitalization can help to measure the quality of obstetric care provided within health facilities. In Iran for example, suboptimal

obstetric care was found in 75% of near miss cases[32.] The occurrence of maternal near miss after receiving suboptimal care following C-section has also needs reported elsewhere.[33]

SAMM study has many strength. The study is the first of its kind in ETHOPIA to document the incidence & causes of maternal near miss using the newly developed WHO case identification criteria. Prospective case identification was used for a consecutive period of two year. The use of a standardized WHO data abstraction tool to abstract data was also one of the strength of the study, which might also have had its own implication for the quality of the study.[34]

However, our study had certain limitations. The follow up time used by the WHO to define maternal near miss has duration of 42 days postpartum. However, because of logistic & feasibility concern, our follow up time was limited to only the length of hospital stay.

CONCLUSION

The study demonstrated a lower SAMM incidence ratio compared to previous country level studies. Underlying & contributory causes of maternal near miss are still prevalent. Evidence based interventions designed to optimize the intrapartum management of life threatening obstetric complications, specially hypertensive disorders & obstetric haemorrhage, could reduce the occurrence of maternal near miss problems during hospitalization.

The majority of near miss cases happened before the women's arrival at the participating hospitals, which underscores the importance of eliminating the pre hospitals, barriers. Hence, it is necessary to create awareness among the antenatal mothers and their relatives too, about the preexisting signs & symptoms of hypertensive disorders through area VHN,SHN at primary health centre level itself., Hence, it is necessary to create awareness among the population, about the health education and importance of health during pregnancy, life style modifications, food intakes during antenatal period, via dramas, speech at AN clinic, videos, multimedia, etc.,

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S.No	NAME	AGE	SES	IP.NO	OBSTETRIC CODE	GA	DATE OF NEAR MISS	ADMITTED WITH NO DISORDER	ADMITED WITH DISORDER			SIGNS & SYMPTOMS	CAUSE OF NEAR MISS			DIAGNOSIS	INTERVENTION DONE	BLOOD TRANSFUSION	REFFERAL	MODE OF DELIVERY	ORGAN INVOLVED	ICU STAY	TOTAL STAY
									1	2	3		1	2	3								
1	NAGAMMAL	25	III	41924	PRIMI	38W	6/10/2016	NO	y		y	TACHY,HTN,EXT CREPTS		GHTN		GHTN,PE	MV,INJ.LASIX	NO	PHC	EME HYSTRECTOMY	LUNGS	7	17
2	KALIYAMMAL	40	IV	46460	MULTI	32W	27/10/16	NO	Y			TACHY,HTN,CONVULSIONS		GHTN		AP ECLAMPSIA	,MV,INJ.Mgso4	NO	GH	LN	BRAIN	12	19
3	KANAGAMMAL	20	III	49608	PRIMI	28W	11/7/2016	NO	Y			TACHY,JAUNDICE,		HAEMORHAGE		HELLP,ABRUPTION III	BLD& BLD PRODUCTS	Y	PHC	EMER LSCS	LIVER	18	32
4	SARANYA	24	III	55423								TACHY,HTN,EXT CREPTS		GHTN		GHTN,PE	NO	NO	PHC	EMER LSCS	LUNGS	8	25
5	ANGALESHWARI	28	IV	55765	G3P2L2	30	24/9/16	NO	Y			TACHY,PALLOR,		HAEMORRHAGE		ABRUPTION GRADE III	BLD& BLD PRODUCTS	Y	PHC	EMER LSCS		14	34
6	RATHIKA	29	III	53998	PRIMI	36	16/9/16	YES			Y	FEVER,TACHY		SEPSIS		POST SURGICAL SEPSIS	,HIGHER ANTIBIOTICS	N	SELF	EMER LSCS	KIDNEY	15	37
7	RAMU	31	III	64063	P1L1	PN	25/10/16	YES			Y	FEVER,TACHY		SEPSIS		POST SURGICAL SEPSIS	HIGHER ANTIBIOTIC	N	PVT	EMER LSCS	KIDNEY	7	14
8	CHITRA	33	IV	70545	P2L2	PN	29/11/16	NO	Y			PALLOR,TACHY,HYPO		HAEMORRHAGE		ATONIC PPH	BLD & BLD PRODUCTS	Y	GH	EMER HYSTRECTOMY		12	16
9	RADHIKA	30	III	38512	G3P2L2	38	18/12/16	NO	Y			TACHY,HYPO,EXTENCREPTS		GHTN		GHTN,PE,	MV,BLD,CARDIOTONICS	Y	PHC	EMER LSCS	LUNGS	18	30
10	KOKILA	20	IV	38710	PRIMI	26	27/12/16	NO	Y			TACHY,HYPO,PALLOR		HAEMORRHAGE		CENTRAL PLACENTA PREVIA	MV,BLD& BLD PRODUCTS	Y	PHC	EMER HYSTEROTOMY		6	15
11	SARANYA	20	III	73876	P2L2	PN	17/12/16	NO	Y			TACHY,HYPO,PALLOR		HAEMORRHAGE		2 PPH	MV,BLD & BLD PRODUCTS	Y	PHC	LN/ EMER HYSTRECTOMY		12	25
12	SANGEETHA	20	III	75228	P1L1	PN	23/12/16	NO		Y		DYSPNOEIC,BRADY		CHD		ACYANOTIC HEART DISEASE	MV,CARDIOTONICS	N	SELF	LN	HEART	14	22
13	MAHESH	19	III	75235	PRIMI	36	27/12/16	NO	Y			TACHY, GHTN,CONVULSIONS		GHTN		AP ECLAMPSIA	MV	N	PHC	EMER LSCS	BRAIN	8	28
14	MADHUMALAR	21	IV	75663	PRIMI	36	6/12/2016	NO	Y			GHTN,UNCONSCIOUS		GHTN		GHTN,CVT	MV	N	PHC	EMER LSCS	BRAIN	42	60
15	ELAVARASAN	28	III	53421	G2P1L1	30	28/1/17	NO	Y			TACHY,HYPO,PALLOR		HAEMORRHAGE		CENTRAL PLACENTAPREVIA	BLD& BLD PRODUCTS	Y	GH	EMER HYSTERECTOMY		6	17
16	SIVASANGARI	23	III	33821	PRIMI	32	13/1/17	NO		Y		DYSPNOEIC,BRADY		ANAEMIA		ANAEMIA, CCF	BLD& BLD PRODUCTS	Y	PHC	EMER LSCS	SPLEEN, HEART	13	28
17	SIVASUDHA	24	IV	62711	PRIMI	34	2/1/2017	NO	Y			TACHY,GHTN,THROMBOCYTPENIA		GHTN		SEVERE PREECLAMPSIA,HELLP,PALLOR	MV, BLD& BLD PRODUCTS	Y	PHC	EMER LSCS,	BRAIN,LIVER	9	30
18	NISHANTHINI	22	V	45012	P2L2	PN	24/1/17	NO	Y			TACHY,HYPO,THROMBOCYTOPENIA		GHTN		SEVERE PREECLAMPSIA,HELLP,ATONIC PPH	,MV,BLD, INJ.MgSO4	Y	PHC	EMERGENCY LAPAROTOMY	BRAIN,LIVER	15	29
19	PREMADEVI	22	IV	9612	PRIMI	36	5/1/2017	NO	Y			CONVULSION,TACHY,GHTN		GHTN		AP ECLAMPSIA	MV,BLOOD,INJ.MgSO4	Y	PHC	EMERGENCY LSCS	BRAIN	12	23
20	KATHIJABEEVI	29	III	11237	G3P2L2	38	5/1/2017	NO	Y			GHTN,UNCONSCIOUS		GHTN		,SEVERE PREECLAMPSIA,HELLP	PLATELETS,INJ.MgSO4	Y	PHC	SPONTANEOUS EXPULSION	LIVER,BRAIN	10	30
21	MAHESHWARI	28	IV	5381	G3A2	_	29/1/2017	NO	Y			PALLOR,TACHY,HYPO		HAEMORRHAGE		RUPTURE ECTOPIC	BLD& BLD PRODUCTS	Y	GH	EMER LAPROTOMY		8	20
22	PANCHAVARNAM	23	III	7729	PRIMI	34	9/2/2017	NO	Y			PALLOR,TACHY,HYPO		HAEMORRHAGE		ABRUPTION GRADE III	BLD& BLD PRODUCTS	Y	PHC	EMERGENCY LSCS		12	34
23	GAYATHRI	29	IV	6229	PRIMI	32	30/1/2017	NO	Y			UNCONSCIOUS, GHTN,THROMBOCYTOPENIA		GHTN,HAEMORRHAGE		HELLP,ABRUPTION III	MV,BLD	Y	GH	EMERGENCY L	LIVER	14	30
24	MURUGESHWARI	26	III	13596	G4A3	28	7/3/2017	YES	Y			TACHY,HYPO,PALLOR		HAEMORRHAGE		PLACENTA PREVIA	MV, BLD	Y	PHC	EMER HYSTEROTOMY		7	21
25	MAHALAKSHMI	31	III	15281	PRIMI	_	14/3/2017	NO	Y			TACHY,HYPO,PALLOR		HAEMORRHAGE		RUPTURED ECTOPIC	BLD	Y	self	EMER LAPARATOMY		6	24

26	PUSHPARANI	36	III	17793	G5P1L1A3	30	21/3/2017	NO	Y			GHTN,TACHY,PALLOR	GHTN,HAEMORRHAGE	ABRUPTION GRADE III &DIC	MV, BLD& BLD PRODUCTS	Y	PHC	EMER SUBTOTAL HYSTRECTOMY	MODS	6	17
27	MAHALAKSHMI	22	IV	20604	G2P1L0	28	7/4/2017	NO	Y			TACHY,HYPO	HAEMORRHAGE	PLACENTA INCRETA	MV,IONOTROPICS,BLD	Y	PHC	EMER HYSTRECTOMY		24	32
28	DHANALAKSHMI	31	III	28397	G3P2L2	30	14/5/2017	NO	Y			TACHY,HYPO,PALLOR	HAEMORRHAGE	RUPTURE UTERUS	BLD,BLD PRODUCTS	Y	PHC	EMER LAPARATOMY		7	15
29	JEYASUTHA	29	III	88410	PRIMI	30	22/6/17	NO			Y	FEVER,TACHY,ICTERIC	SEPSIS	SEPSIS	HIGHER ANTIBIOTIC	Y	GH	LN	MODS	13	30
30	KANMANI	29	IV	37083	G3P2L2	37	17/6/2017	NO	Y			TACHY,HYPO	HAEMORRHAGE	ATONIC PPH	MV,BLD& BLD PRODUCTS	Y	PHC	EMER HYSTERECTOMY		6	16
31	HARITHA	27	III	36859	P2L2	PN	16/6/2017	NO	Y			TACHY,HYPO	HAEMORRHAGE	2 PPH	MV,BLD& BLD PRODUCTS	Y	GH	EMER HYSTRECTOMY		12	22
32	OCHAMMAL	32	IV	43481	G3P2L2	36	13/7/2017	NO	Y			TACHY,HYPO ,PALLOR	HAEMORRHAGE	PLACENTA ACRETA	BLD&BLD PRODUCTS	Y	PHC	EMER TOTAL HYSTRECTOMY		7	14
33	VAITHEGI	26	III	43818	G3P2L2	34	14/7/2017	NO	Y			GHTN,THROMBOCYTOPENIA	GHTN	GHTN, PARTIAL HELLP	BLD & BLD PRODUCTS	Y	PHC	LN	BRAIN,LIVER	11	30
34	MUTHUMEGALA	21	II	47793	PRIMI	36	30/7/20`7	NO	Y			GNTN,THROMBOCYTOPENIA	GHTN	APECLAMPSIA,HELLP	BLD&BLD PRODUCTS	Y	PHC	EMERG LSCS	BRAIN,LIVER	13	28
35	RABAYATHUL BASRIYA	24	III	47290	G2P1L1	38	28/7/2017	NO	Y			BRADY,THREADY PULSE	HAEMORRHAGE	ABRUPTION III/HAEMORRHAGIC SHOCK	BLD&& BLD PRODUCTS	Y	PHC	EMER HYSTERECTOMY		14	33
36	kowsalya	20	IV	40993	PRIMI	32	20/10/2017	NO	Y			GHTN,UNCONSCIOUS	GHTN	AP ECLAMPSIA	MV, BLD& BLD PRODUCTS	Y	PHC	LN,	BRAIN	6	15
37	DEVI	25	III	45054	PRIMI	32	21/7/2017	NO	Y			GHTN,UNCONSCIOUS	GHTN	AP ECLAMPSIA	MV,BLD& BLD PRODUCTS	Y	PHC	EMER LSCS	BRAIN	12	18
38	MANIMEGALAI	27	III	47713	PRIMI	34	30/7/2017	NO	Y			GHTN,HELLP,THROMBOCYTOPENIA	GHTN	ACUTE PE ,HELLP	MV,BLD& BLD PRODUCTS	Y	GH	EMER LSCS	LIVER,LUNGS	16	23
39	SHANTHI	29	IV	41008	G2P1L1	32	3/7/2017	NO	Y			SEVERE PREECLAMPSIA	GHTN	PE,PULMONARY EMBOLI	MV	Y	PHC	EMERGENCY LSCS	HEART,LUNGS	11	19
40	AMUTHA	34	III	49520	PRIMI	36	6/8/2017	NO	Y			GHTN,ACUTE PE	GHTN	ACUTE PE ,PPCM	MV	Y	PHC	EMER LSCS	HEART,LUNG	13	25
41	TAMILAZHAGI	27	IV	51882	P1L1	PN	15/8/2017	NO	Y			GHTN,FEVER	SEPSIS	PUERPERAL SEPSIS	MV,HIGHER ANTIBIOTICS	Y	GH	LN		8	23
42	SURYA	20	III	78441	PRIMI	38	12/8/2017	NO		Y		DYSPNOEIC,TACHY	RHD	RHD/ SEVERE MS/MOD MR/ MOD PHTN	MV,DIGITALISATION,CARDIOTONICS	NO	PHC	EMER LSCS	HEART,LUNGS	8	20
43	NOORESHWARI	26	IV	76242	G2P1L1	26	3/11/2017	NO		Y		FEVER,TACHY, COMA	VIRAL FEVER	DENGUE FEVER	MV	Y	PHC	SPONTANEOUS EXPULSION	LIVER	14	38
44	SARANYA	25	III	86418	G3P1L1A1	38	9/12/2017	NO	Y			TACHY,BRADY	HAEMORRHAGE	ATONIC PPH	MV,BLD& BLD PRODUCTS	Y	GH	EMER HYSTRECTOMY		9	16
45	MAHESHWARI	28	IV	58121	RUPTURED ECTOPIC	0	29/1/17	NO	Y			TACHY,BRADY	HAEMORRHAGE	RUPTURE ECTOPIC	BLD,BLD PRODUCTS	Y	PHC	EMERG LAPAROTOMY		13	24
46	LALITHA	28	III	88441	G4P3L2A1	36	13/2/17	NO	Y			GHTN	GHTN	,SEVERE PREECLAMPSIA,HELLP	BLD,BLD PRODUCTS	Y	PHC	ASSISSTED BREECH	BRAIN,LIVER	5	12
47	ROSELINE METAALFA	21	III	62636	G2A1	34	27/3/17	NO	Y			SEVERE PREECLAMPSIA	GHTN	SEVERE ECLAMPSIA,HELLP,DIVC	BLD,BLD PRODUCTS	Y	GH	EMER HYSTRECTOMY	BRAIN,LIVER	13	18
48	SANGEETHA	28	III	26338	G2P1L1	36	6/5/2017	NO	Y			TACHY,DYSPNOEIC	HAEMORRHAGE	RUPTURE UTERUS	BLD	Y	GH	EMER RPT LSCS,UTERINE RENT CLOSURE		11	20
49	GAYATHRI	20	III	21416	PRIMI	20	10/4/2017	NO	Y			TACHY,DYSPNOEIC	GHTN	SEVERE PREECLAMPSIAACUTE PE ,	BLD,MV	Y	SELF	SPONTANEOUS EXPULSION	BRAIN,LUNGS	13	16
50	SARANYA	28	IV	62875	GP1L1	28	13/4/17	NO	Y			GHTN,DYSPNEOIC	GHTN	EMER LSCS	BLD,BLD PRODUCTS	Y	PHC	EMER LSCS		11	17
51	SARASU	19	III	35707	PRIMI	34	12/6/2017	NO	Y			GHTN,CONVULSION	GHTN	GHTN,AP ECLAMPSIA	BLD,BLD PRODUCTS	Y	GH	EMER LSCS	BRAIN	9	16
52	PRIYA	26	IV	34821	A2		17/6/17	NO	Y			TACHY,HYPO,PALLOR	HAEMORRHAGE	RUPTURED ECTOPIC	BLD,BLD PRODUCTS	Y	PHC	EMER LAPRATOMY		7	13
53	SHAHITHA	24	III	43268	G2P1L1	38	12/7/2017	NO	Y			TACHY,HYPO	HAEMORRHAGE	ATONIC PPH	,BLD BLD PRODUCTS	Y	PHC	EMER HYSTRECTOMY		6	13

54	RUBIYATHAL BARBRIYA	25	III	47290	G2P1L1	38	28/7/17	NO	Y			TACHY,HYPO,PALLOR	HAEMORRHAGE	ABRUPTION GRADE III	BLD,BLD PRODUCTS	Y	PHC	EMER HYSTRECTOMY		13	20
55	MEESAMANI	27	III	44877	G2P1L1	36	28/7/17	NO	Y			TACHY,HYPO	HAEMORRHAGE	ABRUPTION GRADE III	BLD,BLD PRODUCTS	Y	PHC	EMER LSCSC		14	21
56	BABY	25	IV	50050	G3P2L2	32	8/8/2017	NO	Y			GHTN, SEVERE PREECLAMPSIA, HELLP	GHTN	IMMINENT ECLAMPSIA	INJ.MgSO4,BLD&BLD PRODUCTS	NO	PHC	EMER LSCS	BRAIN	8	14
57	CHITRA	35	III	51214	G4P2L2A1	34	12/8/2017	NO	Y			TACHY,HYPO	HAEMORRHAGE	ABRUPTIO PLACENTA	BLD&BLD PRODUCTS	Y	GH	EMER LSCS		9	13
58	JOTHI	28	III	56712	G2P1L1	30	4/9/2017	NO	Y			HYPO,THROMBOCYTOPENIA	GHTN	SEVERE PREECLAMPSIA,HELLP	BLD& BLD PRODUCTS	Y	PHC	EMER LSCS	BRAIN,LIVER	7	19
59	SHARMILA	24	IV	50899	G3P1L1	36	11/8/2017	NO	Y			HYPO,TACHY	HAEMORRHAGE	PLACENTA ACCRETA	BLD& BLD PRODUCTS	Y	PHC	EMER LSCS		8	15
60	SELVI	22	III	65112	G3P1L1		2/10/2017	NO	Y			HYPO,TACHY	HAEMORRHAGE	RUPTURE ECTOPIC	BLD&BLD PRODUCTS	Y	PHC	EMER LAPARATOMY		5	13
61	PRIYA	20	IV	72468	PN	PN	4/10/2017	NO		Y		FEVER, CREPTS	VIRAL FEVER	DENGUE FEVER		Y	PHC	PN	LIVER	13	22
62	NATHIYA	23	III	72027	G2PL1	30	23/10/17	NO	Y			HYPO,TACHY	HAEMORRHAGE	ABRUPTION GRADE III	BLD& BLD PRODUCTS	Y	GH	EMER LSCS		11	19
63	GOMATHI	25	IV	79656	PRIMI	28	23/11/17	NO		Y		DYSPNOEIC,TAC,GHTN	RHD	RHD/ SEVERE MS/MOD MR/ MOD PHTN	MV,DIGITALISATION,CARDIOTONICS	Y	SELF	SPONTANEOUS EXPULSION	HEART,LUNG	9	22
64	ANITHA	27	IV	77557	G2P1L1	32	7/11/2017	NO	Y			TACHY,HYPO	HAEMORRHAGE	ABRUPTION GRADE III	BLD&BLD PRODUCTS	Y	PHC	EMER LSCS		12	35
65	JELMIA BANU	29	III	76781	G2P1L1		5/11/2017	NO	Y			TACHY,HYPO	HAEMORRHAGE	RUPTURED ECTOPIC	BLD& BLD PRODUCTS	Y	PHC	EMER LAPARATOMY		17	23
66	FARSHITHA	24	IV	78983	G3P2L2	34	12/11/2017	NO	Y			TACHY,HYPO	HAEMORRHAGE	PLACENTA PREVIA II	BLD& BLD PRODUCTS	Y	PHC	EMERGENCY LSCS		18	40
67	RATHA	23	III	76791	PRIMI	36	5/11/2017	NO	Y			TACHY, HYPO	HAEMORRHAGE	ATONIC PPH	BLD& BLD PRODUCTS	Y	PHC	EMER LSCS		7	14
68	RAMANA	24	III	67974	PRIMI	34	14/11/17	NO	Y			TACHY,HYPO	HAEMORRHAGE	BLEEDING PLACENTA PREVIA	BLD& BLD PRODUCTS	Y	PHC	EMER LSCS		14	33
69	PASUPATHI	23	III	79762	PRIMI	33	14/11/17	NO	Y			GHTN,THROMBOCYTOPENIA	GHTN	IMMINENTECLAMPSIA, HELLP	BLD& BLD PRODUCTS	Y	PHC	EMER LSCS	BRAIN,LIVER	8	15
70	SASIKALA	30	IV	85053	PRIMI	34	4/12/2017	NO	Y			GHTN,CONVULSION	GHTN	AP ECLAMPSIA	BLD & BLD PRODUCTS	Y	PHC	EMER LSCS	BRAIN	7	14
71	MARIYA ARTHY	27	III	64167	PRIMI	36	3/12/2017	NO		Y		DYSPNOEA,TACHY	RHD	SEVERE MS/ MR	MV,	N	PHC	LN	HEART	6	13
72	MEENA	24	IV	85446	G3P2L2	34	6/12/2017	NO	Y			TACHY, HYPO	HAEMORRHAGE	PLACENTA PREVIA	MV,BLD& BLD PRODUCTS	Y	PHC	EMER LSCS		5	14
73	AKILA	28	III	85996	G2P1L1		7/12/2017	NO	Y			TACHY,HYPO	HAEMORRHAGE	RUPUTRE ECTOPIC	BLD& BLD PRODUCTS	Y	PHC	EMER LAPARATOMY		11	21
74	SARANYA	25	III	86418	G3P1L1A1	34	9/12/2017	NO	Y			TACHY,HYPO	HAEMORRHAGE	ATONIC PPH	MV,BLD& BLD PRODUCTS	Y	PHC	EMER HYSTRECTOMY		5	16

75	VEERALAKSHMI	22	IV	88643	G2P1L1	32	18/12/17	NO	Y			GHTN,THROMBOCYTOPENIA	GHTN	HELLP, GHTN	PLATELETS	Y	PHC	EMER LSCS	LIVER	6	13
76	VEMBU	32	III	182301	G3P1L1A1		27/3/17	NO	Y			TACHY,HYPO	HAEMORRHAGE	RUPTURED ECTOPIC	BLD& BLD PRODUCTS	Y	PHC	EMER LAPARATOMY		8	17
77	TAMILILLAKIYA	27	III	25402	PRIMI	32	22/5/2017	NO	Y			GHTN,TACHY,PALLOR	GHTN	ABRUPTION GRADE III	BLD& BLD PRODUCTS	Y	PHC	EMER HYSTEROTOMY		7	20
78	NALLAMMAL	21	III	34821	PRIMI	34	8/6/2017	NO	Y			TACHY,HYPO	HAEMORRHAGE	PLACENTA PREVIA	BLD& BLD PRODUCTS	Y	SELF	EMER LSCS		5	19
79	SELVI	26	IV	71140	G2P1L1	34	20/10/17	NO	Y			TACHY,HYPO	HAEMORRHAGE	ABRUPTIO PLACENTA	BLD& BLD PRODUCTS	Y	GH	EMER LSCS		6	16
80	VENNILA	26	IV	71890	PRIMI	36	22/10/17	NO	Y			GHTN,TACHY,UNCONSICIOUS	GHTN	AP ECLAMPSIA	MV,INJ MgSO4	Y	PHC	EMER LSCS	BRAIN	13	29
81	MERLIN ELIZABETH	19	III	2265	PRIMI	18	10/1/2018	NO	Y			UNCONSCIOUS, HYPO	HYPEREMESIS GRAVIDORUM	CENTRAL PONTINE MYELINOSIS	MV,FLUID MANAGEMENT	Y	GH	SPONTANEOUS EXPULSION	BRAIN	38	56
82	RAJESHWARI	29	III	9303	G2P1L0	36	11/1/2018	NO	Y			HYPO,TACHY,PALLOR	HAEMORRHAGE	RUPTURE UTERUS	MV, BLD& BLD PRODUCTS	Y	PHC	EMER HYSTRECTOMY		5	16
83	HEMALATHA	31	II	2686	G7P4L4	36	12/1/2018	NO	Y			HYPO,TACHY,PALLOR	HAEMORRHAGE	ATONIC PPH	MV, BLD& BLD PRODUCTS	Y	PHC	EMER HYSTRECTOMY		7	18
84	THENMOZHI	20	III	9040	PRIMI	34	25/12/17	NO			Y	HYPO, ICTERIC	AFLP	AFLP	MV,BLD& BLD PRODUCTS	Y	GH	LN	LIVER	32	44
85	SASIKALA	28	IV	5518	PRIMI	36	25/1/18	NO	Y			HYPO,TACHY,PALLOR	HAEMORRHAGE	PLACENTA PREVIA	MV,BLD& BLD PRODUCTS	Y	PHC	OUTLET FORCEPS		28	40
86	MEENA	20	III	1561	PRIMI	38	12/3/2018	NO		Y		HYPO,TACHY,THROMBOCYTOPENIA	VIRAL FEVER	VIRAL FEVER	PLATELETS	Y	PHC	LN	LIVER,SPLEEN	17	46
87	THANGAMANI	39	II	1727	P4L4	PN	19/3/18	NO		Y		DYSPNOEIC,TACHY,PALLOR	ANAEMIA	ANAEMIA, PPCM	MV,BLD& BLD PRODUCTS	Y	SELF	LN	HEART	12	23
88	ANJALAI	33	III	1797	G5P4L4	34	22/3/18	NO	Y			TACHY,HYPO	HAEMORRHAGE	ABRUPTION GRADE III	BLD& BLD PRODUCTS	Y	PHC	EMER LSCS		13	24
89	MUTHULAKSHMI	27	III	1805	G3P2L2	34	22/3/18	NO	Y			GHTN,DYSPNEOIC	GHTN	GHTN,ACUTE PE	MV,INJ.LASIX	Y	PHC	LN	LUNGS	13	30
90	NAGAVALLI	23	IV	1937	PRIMI	36	28/3/18	NO	Y			GHTN, TACHY,	GHTN	AP ECLAMPSIA	MV ,INJ MGSO4	NO	PHC	LN	BRAIN	11	21
91	PUSHPARANI	36	III	1987	G2P11	38	21/3/18	YES	y			TACHY,HYPO	HAEMORRHAGE	ATONIC PPH	BLD& BLD PRODUCTS	Y	PHC	EMER HYSTRECTOMY		9	16
92	MAHALAKSHMI	27	IV	2239	PRIMI	34	24/4/18	NO	Y			GHTN,TACHY,UNCONSICIOUS	GHTN	GHTN,AP ECLAMPSIA	MV,	NO	PHC	LN	BRAIN	6	18
93	MOHANADEVI	22	III	2736	P1L1	PN	1/5/2018	NO	Y			TACHY,HYPO,UNCONSCIOUS	GHTN	GHTN,PP ECLAMPSIA	MV ,INJ.MgSO4	NO	PHC	EMER LSCS	BRAIN	13	25
94	CHELLAMANI	32	III	31079	G4P3L3	36	17/5/18	NO	Y			GHTN, TACHY,	GHTN	ATONIC PPH	MV,BLD	NO	PHC	EMER HYSTERCTOMY		6	13
95	VANITHA	22	IV	27179	PILO	PN	1/6/2018	NO	Y			GHTN,TACHY	GHTN	ABRUPTION GRADE III,AP ECLAMPSIA	MV,INJ MgSO4,BLD	NO	GH	EMER LSCS	BRAIN	11	27
96	PAPPATHY	27	III	44130	G3P2L2	38	11/7/2018	NO	Y			TACHY,HYPO	HAEMORRHAGE	ATONIC PPH	BLD& BLD PRODUCTS	Y	PHC	EMER LAPARATOMY		3	10
97	PERIYANATCHI	31	V	30319	G5P3L3	34	14/5/18	NO	Y			TACHY,HYPO,PALLOR	HAEMORRHAGE	RUPTURE UTERUS	BLD& BLD PRODUCTS	Y	PHC	EMER HYSTRECTOMY		7	14
98	KALAIMANI	22	IV	31001	PILI	PN	21/5/18	NO	Y			GHTN,TACHY,UNCONSICIOUS	GHTN	PP ECLAMPSIA	MV	NO	PHC	EMER LSCS	BRAIN	8	14
99	MAHALAKSHMI	21	III	34117	PRIMI	34	30/5/18	NO	Y			TACHY,HYPO	HAEMORRHAGE	ATONIC PPH	BLD & BLD PRODUCTS	Y		EMER HYSTRECTOMY		11	17
100	MOULIYA	20	IV	65312	PRIMI	36	10/6/2018	NO	Y			GHTN,TACHY,HYPO	GHTN	AP ECLAMPSIA	MV	NO	PHC	LN	BRAIN	9	28
101	BHUVANESHWARI	31	III	38537	G3P2L2	34	18/6/18	NO	Y			GHTN,TACHY	GHTN	ATONIC PPH	BLD& BLD PRODUCTS	Y	GH	EMER LSCS		13	27
102	LAKSHMI	30	IV	4204	G4P3L3	30	2/7/2018	NO	Y			GHTN, TACHY,	GHTN	HELLP,AP ECLAMPSIA	BLD& BLD PRODUCTS,MV	Y	PHC	EMER LSCS	BRAIN,LIVER	13	32
103	PADMA	29	III	5317	PRIMI	32	14/8/18	NO	Y			GHTN,TACHY	GHTN	AP ECLAMPSIA	MV	Y	PHC	SPONTANEOUS EXPULSION	BRAIN	5	15
104	MARIYAYEE	22	III	53464	P1L1	PN	17/8/18	NO	Y			GHTN,HYPO	GHTN	PP ECLAMPSIA	MV	Y	PHC	LN	BRAIN	5	13
105	THILAGAVATHY	32	IV	56294	PRIMI	28	5/8/2018	NO	Y			GHTN,HYPO,UNCONSCIOUS	GHTN	GHTN,IUD,AP ECLAMPSIA	MV,BLD & BLD PRODUCTS	Y	PHC	EMER LSCS	BRAIN	6	16

ABBREVIATIONS

MNM	-	Maternal Near Miss
SAMM	-	Severe Acute Maternal Morbidity
PPH	-	PostPartum Haemorrhage
APH	-	AntePartum Haemorrhage
AP Eclampsia	-	AntePartum Eclampsia
PP Eclampsia	-	Postpartum Eclampsia
HELLP	-	Hemolysis, Elevated Liver Enzymes Low Platelets
ICD	-	International Classification of the Diseases
UNICEF	-	United Nation International Children's Education Funds
UNPF	-	United Nation Population Fund
WHO	-	World Health Organisation

MASTER CHART CODING

D	-	Days
H	-	Hours
Y	-	Yes
N	-	No
LN	-	Labour Natural
Epi	-	Episotomy
Bld	-	Blood
HELLP	-	Hemolysis, Elevated Liver Enzymes, Low Platelets.
P	-	Primi
M	-	Multi

PROFORMA

Name	:	……
Age	:	……
Education	:	……
IP No	:	……
D.o. Admission	:	……
D.o. Delivery	:	……
D.o. Near MISS	:	……
D.o. Discharge		……
Type of admission	:	……
LMP	:	……
EDD	:	……
Duration of hospital stay	:	……
Duration of ICU stay	:	……
Obstetric code	:	……
Gestational age	:	……
Address and contact no	:	……
Presenting complaints	:	……
Menstrual history	:	……

Marital history	:	……
Obstetric history	:	……
Past history	:	……
General examination	:	……
Height	:	……
Weight	:	……
Anaemia	:	……
Edema	:	……
Pulse Rate	:	……
BP	:	……
CVS	:	……
RS	:	……
Obstetric examination	:	……
P/A examination	:	……
P/V examination	:	……

DIAGNOSIS

Date and time of induction : ……

Indication for induction : ……

Mode of delivery : ……

Baby weight : ……

Baby sex : ……

Apgar : ……

Puerperium : ……

Intervention : ……

CONSENT FORM

I agree to participate in the study entitled "**STUDY OF SAMM AT A TERTIARY CARE HOSPITAL AT MGMGH, KAPV GOVT MEDICAL COLLEGE HOSPITAL**".

I confirm that I have been told about this study in my mother tongue and have had the opportunity to clarify my doubts.

I understand that my participation is voluntary and I may refuse to participate at any time without giving any reasons and without affecting my benefits.

I agree not to restrict the use of any data or results that arise for this study.

Name of the participant :

Signm/ Thumb Print :

Name of the Investigator : Dr. A.ADHIRAI

Sign of Investigator :

தகவல் படிவம்

திருச்சிராப்பள்ளி, மகாத்மா காந்தி நினைவு மருத்துவமனையின் கிஆபெ விசுவநாதன் மருத்துவகல்லூரியில் மகப்பேறு மற்றும் பெண்கள் நல மருத்துவ துறையில் மேற்கொள்ளப்படும் ஆய்வு தொடர்பான படிவம் இது.

இந்த ஆய்வு அனுபவம் வாய்ந்த மருத்துவர்களின் உதவியோடு நடத்தப்படுகிறது.
ஆபாயகரத்தில் இருந்து காப்பாற்றப்பட்ட கர்பிணி பெண்கள் பற்றிய ஆய்வு

இதனால், எந்தவித பின்விளைவுகளும் நோயாளிகளுக்கு வராது

இந்த ஆய்வு நோயாளிகள் தங்கள் சுய விருப்பத்துடன் முன்வந்தால் மட்டுமே மேற்கொள்ளப்படும்.

சுய ஒப்புதல் படிவம்

“அபாயகரத்தில் இருந்து காப்பாற்றப்பட்ட கர்ப்பிணி பெண்கள் பற்றிய ஆய்வு”

ஆய்வாளர்

மருத்துவர்.ஆ.ஆதிரை

முதுநிலை பட்ட மேற்படிப்பு மாணவர்

மகப்பேறு மற்றம் பெண்கள் நலத்துறை

மகாத்மா காந்தி நினைவு மருத்துவமனை

கிஆபெ விசுவநாதன் மருத்துவகல்லூரி

திருச்சிராப்பள்ளி

பெயர்:.....வயது:..... உள்ளிருப்பு எண்:.....

இந்த மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது என்னுடைய சந்தேகங்களை தீர்க்கவும் அதற்காள தகுந்த விளக்கங்களை பெறவும் வாய்ப்பளிக்கப்பட்டது.

நான் இவ்வாய்வில் தன்னிச்சையாகத்தான் பங்கேற்கிறேன். எந்த காரணத்தினாலும் எந்த கட்டத்திலும் எந்த சட்டசிக்கலும் இன்றி இந்த ஆய்விலிருந்து விலகிக் கொள்ளலாம் என்றும் அறிந்து கொண்டேன்.

நான் ஆய்விலிருந்து விலகிக்கொண்டாலும் ஆய்வாளர் என்னுடைய மருத்துவ அறிக்கைகளை பார்ப்பதற்கோ அல்லது உபயோகிக்கவோ என் அனுமதி தேவையில்லை எனவும் அறிந்து கொண்டேன் என்னை பற்றிய தகவல்கள் ரகசியமாக பாதுகாக்கப்படும் என்பதையும் அறிவேன்.

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களையும் பரிசோதனை முடிவுகளையும் ஆய்வாளர் அவர் விருப்பத்திற்கேற்ப பயன்படுத்திக் கொள்ளவும் அதனை பிரகரிக்கவும் முழுமனதுடன் சம்மதிக்கிறேன்.

இந்த ஆய்வில் பங்கு கொள்ள ஒப்புக்கொள்கிறேன் எனக்கு கொடுக்கப்பட்டுள்ள அறிவுரையின்படி நடந்து கொள்வதுடன் ஆய்வாளருக்கு உண்மையுடன் இருப்பேன் என்றும் உறுதி அளிக்கிறேன்.

உடல்நலம் பாதிக்கப்பட்டாலோ வழக்கத்திற்கு மாறான ஏதேனும் நோய்குறி தென்பட்டாலோ அதனை தெரிவிப்பேன் என்றும் உறுதி கூறுகிறேன்.

இந்த ஆய்வில் எனக்கு எவ்விதமான பரிசோதனைகளையும் சிகிச்சைகளையும் மேற்கொள்ள நான் என் முழுமனதுடன் சம்மதிக்கிறேன்.

ஆய்வாளரின் கையொப்பம் நோயாளியின் கையொப்பம்